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RESEARCH RESULTS for FY 1977 and PLANS for FY 1978 and 1979

DECEMBER 1977

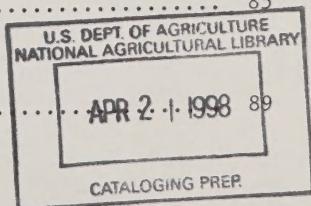
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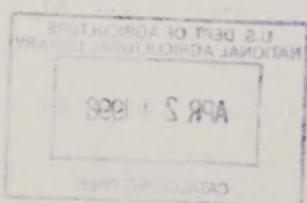


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SECTION I

**Highlights of results of the Fiscal Year 1977
program and plans for FY '78 and '79 at the
FY '78 resource level.**

FARM PROGRAMS AND POLICIES

Examples of Program Results, FY '77

Farm Income

Comprehensive historical farm income statistics were prepared and published. Current farm income was estimated and monthly assessments of the farm sector income accounts were made. Forecasting efforts were intensified, particularly in connection with numerous farm legislation proposals of the Administration and Congress. Impacts upon major commodity producers were analyzed for their combined impacts upon the farm sector's net income and direct Government costs.

Overall concepts and data problems of the basic farm income procedures and alternative conceptual frameworks for estimating and forecasting agricultural sector developments were reviewed in a workshop paper. A tighter accounting system was implemented for handling cash receipts and inventory estimates for the major crops. Accelerated processing of the 1976 Farm Expenditure Survey allowed use of the survey results in making the June revisions for calendar years 1975 and 1976. These latter developments should help minimize the magnitude of future revisions in total net farm income.

Significant improvements in data acquisition and software development were also achieved in FY '77. Additional data development activities in cooperation with SRS should enhance future estimates. For example, SRS has implemented a system to collect monthly sales data and efforts are being made to estimate grain stocks by ownership. Before long, the monthly sales data should serve to give an immediate assessment of sales patterns in line with producer-owned grain inventories. This more current data flow would eliminate one of the major causes of past revisions in the historical income series.

Policy Research--Contributions to the National Debate

During FY '77, the Economic Research Service (ERS), through its Agricultural Policy Analysis program area (APA), published the first issue of the Agricultural-Food Policy Review. Released in early January, the 130-page publication contained 13 articles dealing with policy issues relating to the development of the new farm legislation in 1977. The Review provided excellent background information for the public debate on legislative needs for the Agricultural Act of 1977. Seven thousand copies have been distributed to legislators, universities, Government policyworkers, and industry.

In cooperation with the Policy Studies Organization and the Farm Foundation, ERS sponsored "The 1977 Agricultural Policy Symposium" held in Washington, D.C. during July. A proceedings book is being published with ERS support.

To point up agricultural policy issues, a section on Policy Developments has been included in the ERS monthly publication, Agricultural Outlook. During the spring of 1977, articles traced the evolution of the farm bills through both Houses of Congress. Policy developments relevant to food and agriculture will be outlined in Agricultural Outlook on a regular basis.

During FY '77, ERS continued to publish "Policy Research Notes," in cooperation with the North Central Public Policy Task Force. The newsletter now reaches over 400 economists whose interests focus on agriculture and food policy.

Analyses of Policy Issues Arising from the 1977 Food and Agriculture Legislative Debate

As the legislative process got under way to develop new food and agriculture legislation to replace expiring legislation, ERS responded to a wide variety of requests for analysis. Requests were received from the Office of the Secretary of Agriculture, the Senate and House Agriculture Committees, the Congressional Budget Office, offices of individual Congressmen, the General Accounting Office and other Department of Agriculture agencies. Responses took the form of memorandums, staff papers, working papers, and some reports which were subsequently published.

Several analyses involved economic evaluation of major legislative options. They provided projections of supply, demand, and price for agricultural products (crops and livestock); aggregate net farm income; consumer food expenditures; and net government outlays associated with the proposed legislative options. These evaluations helped policymakers evaluate options and formulate legislative proposals.

Two simulation modeling systems were used as economic tools in evaluations. These systems, plus an array of background data and analyses, had been assembled prior to 1977 in anticipation of analytic needs in the policy development process.

Analysis of Sugar Policy Options

Two fundamental questions concerning U.S. sugar policy options were addressed in a study published by ERS in February 1977. The first was "Would participation in a free world market for sugar jeopardize the existence of a viable U.S. sugar industry?" The second was, "If an overt domestic protectionist policy is deemed appropriate..., what are the likely costs of selected policy options?" Conclusions of the study suggest that world prices are not likely to fall below 10 cents per pound, but that economic losses will be incurred when prices fall below 13 cents per pound. Policy options evaluated were: (1) An international sugar agreement that sets a minimum price at or above the target price, (2) a fixed tariff, (3) supply management with quotas, and (4) direct compensatory payments to producers.

Results of a project to develop a production response model and estimates of U.S. sugar beet acreage under alternative prices for raw sugar and major crops were published in April 1977. Results of the study indicate that raw sugar prices of 16 to 22 cents per pound will probably be needed to maintain 1976 sugar beet acreage in 1980, and that significant regional shifts in the location of production are likely. A similar study of supply response in the domestic cane sugar industry was published in March 1977. Results indicate that most production shifts will occur between 9 and 16 cents per pound, and that current levels of cane sugar production could be maintained at a raw sugar price of 14 cents per pound. The study used 1975-76 cost estimates. More recent estimates of production costs in Florida suggest that a somewhat higher return may be required to maintain production at current levels.

Effects of 1976 Federal Tax Legislation on Limited Partnership in Cattle Feeding

The 1976 Federal tax legislation will affect limited partnership operations involved in cattle feeding. Analysis of the socio-economic characteristics of the limited partners involved revealed that the tax deferral incentive was the primary investment criterion. These investors had an average annual gross income in excess of \$80,000, and their primary occupations were mainly unrelated to agriculture. Most of these limited partners relied on investment advice from stockbrokers, and also had invested in other limited partnership arrangements.

More than half of the 33 cattle-feeding, limited partnership operations examined were organized so that a series of partnerships would be formed under one registration and prospectus. Most operations planned to raise between \$5 million and \$10 million per partnership, and leverage this equity capital by about three times with borrowed capital.

Although the 1976 tax legislation reduces the value of limited partnership operations in cattle feeding, it is not expected to have a major impact on the operation of large custom cattle feedlots. Custom feeding clients, not associated with farming syndications, apparently may continue to operate under the old income tax rules, and a high income investor may still invest in cattle feeding as a custom feeding client.

Report on Provisions of Importance to Agriculture in the Tax Reform Act of 1976

This report reviewed and analyzed the provisions in the Tax Reform Act of 1976 that were of greatest significance to the agricultural sector. It also described the past treatment of certain tax aspects to provide sufficient background information for thorough comprehension of the new provisions. The most significant changes affected estate and gift taxes, tax shelters, and individual income taxes.

This publication (with three printings totalling 25,000 copies) consistently was the most requested ERS publication. Several Congressmen requested multiple-thousand lots. Many States duplicated copies for their own use. For example, Texas distributed an initial printing of 6,000, and Illinois, an initial printing of 5,000. The total number of copies can only be approximated, but it approaches 100,000. The report also precipitated numerous other publications based on its content.

Federal Milk Order Study

In response to a growing concern about the impacts of Federal and State milk marketing orders, and Government regulations in general, ERS conducted a study which projects the regional and aggregate impacts of four alternative pricing policies on farm prices and income, milk production, fluid milk and manufactured dairy product prices and consumption, social welfare, and industry structure for the 1977-85 period. The alternatives analyzed were: (1) continuing current policy, (2) increasing Class I differentials in all regions by 45 cents, (3) decreasing Class I differentials in all regions by 75 cents, and (4) eliminating minimum Class I differentials.

Several independent research projects directly feeding into the market order study have been completed. These include: (1) truck transportation costs of bulk milk, (2) costs of producing Grade A and Grade B milk, (3) impacts of alternative Class I pricing systems on the location and structure of the U.S. dairy industry, (4) average and marginal pricing in the dairy industry, (5) a framework for evaluating the economic impacts of classified pricing of milk, and (6) welfare implications of alternative classified pricing policies for milk.

Sector Model for Oilseed, Oils, and Oil Products

ERS has developed a sector model of the oilseeds, oils, and oil products industry. A recent report based on this model evaluates the effects of Government policies on the industry. Results indicate that with Government purchases and sales of soybeans during the 1965-76 study period, soybean prices averaged 3.3 cents more per bushel than would have resulted with no government intervention. This increase implies a gross redistribution of about \$403 million from the nonagricultural sector, excluding the Government costs of redistribution. Government price support operations increased soybean meal prices an estimated \$1.03 per ton over the same period, while crude and refined soybean oil prices averaged 16 cents per pound higher.

Selected Specific Objectives for FY's '78 and '79

Farm Income

Throughout the period, estimates of present and future year farm income will be made. With the anticipated monthly availability of the preceding month's crop-marketing estimates, a tremendous improvement in current year cash receipt estimates is expected. Historically, such monthly information was collected annually at the end of the crop year, and on occasion, this led to quite substantial revisions in calendar year estimates nearly 1-1/2 years after the event. The new sales data should also allow better estimates of producer-owned grain inventories. These changes will eliminate the single most important cause of annual revisions in both realized and total net farm income.

Crop Acreage Response under Risk

One of the persistent, unanswered questions about the effects of Government farm programs concerns the impact of instability on supply. Do Government programs that stabilize prices increase acreage planted and quantities produced? If so, policymakers need to take this into account in determining support levels and other program features. The effect of instability, however, is extremely difficult to sort out from the effects of other factors that affect supply. In this study, advanced econometric techniques are being applied to State, regional, and U.S. data for wheat, corn, and cotton in order to systematically measure the effect of price and return instability on acres planted. Expected completion dates: wheat, 1978; corn and cotton, 1979.

Effects of Stabilization Programs for Wheat and Feed Grains

Most quantitative analyses of agricultural programs to date have measured effects solely in terms of average or expected values of such variables as price level, farmer income, and program cost. Although there have been numerous attempts to draw qualitative conclusions about program effects on the welfare of consumers, farm operators, and society as a whole, quantification of these welfare effects remains to be accomplished. This study will explicitly take into account the uncertainties involved in acreage response, yields, and demand, and determine the welfare impacts of alternative programs. It will bring together recent theoretical developments and extensive quantitative information about demand and supply for the major agricultural commodities to provide a basis for comparing program alternatives.

Evaluation of the impacts of stabilization programs on farm size and structure, and their implications for the viability of family farms, will be an integral part of the analysis. A special attempt will be made to determine if stable prices will help small farmers. Computer simulation analysis will be used to determine the effectiveness of alternative policy options. Expected completion date: 1979.

Federal Regulations for Fruits, Nuts, and Vegetables

Federal regulations applicable to many fruits, nuts, and vegetables impact directly and indirectly on producers, packers, processors, distributors, and consumers. Benefits of these regulations are often reflected in orderly marketing patterns, price stability, and assurance of product safety and quality. However, these benefits are not without costs. In FY '78, ERS will complete a study appraising the costs and benefits of Federal regulations affecting selected fruits, nuts, and vegetables. Included will be an assessment of the relevance, potential cost increases, and price enhancement effects of current regulations, and the likely impacts of selected modifications in regulatory activities. Particular regulations receiving emphasis include those relating to marketing orders for citrus and almonds, marketing orders in general, and safety standards of the Occupational Safety and Health Administration.

Agricultural-Food Policy Review

During FY '77, ERS prepared the first issue of Agriculture-Food Policy Review (AFPR-1), which provided essential background information for the public debate on the need for the agricultural act of 1977.

A second issue of the Review (AFPR-2) is scheduled for release early in FY '78. This issue will deal with the development, provisions, and implications of the 1977 Farm Act. It will contain five articles authored by members of ERS's Agricultural Policy Analysis staff. The first article will provide the economic background and events transpiring up to November 1976. A second article will focus on the new Administration's proposals. A comparison and documentation of the major legislative proposals will be presented in the third article, while the fourth will detail the provisions of the new bill and examine the implications of the 1977 Act in view of how it can be administered.

A third issue, AFPR-3, scheduled for completion during the summer of 1978, will contain a collection of articles dealing with policy related issues concerning food, international trade, rural development, regulations, and structure. Authorship of these articles, already assigned, will be by recognized authorities in ERS, other Government agencies, and universities.

These two issues of the Review are intended to provide the policy research and policymaking communities with current information on agriculture and food policy with respect to current legislation and related issues.

Effects of Policy Options on the Livestock Industry

To provide increased capability to evaluate policy issues, ERS is developing several analytical tools. During FY '78, a dynamic

quarterly model of the livestock-poultry sectors will be available to trace the effects of potential policy changes over the forthcoming livestock cycles. A regional programming model of the industry is being developed to assess changes in optimal resource use, location of production and processing, and least cost product movement for any year during an analysis period. Projected prices and quantities from these analyses can be further analyzed in a cross-commodity model to assess effects on the feedgrain and other related sectors of the economy. Output of the cross-commodity model can, in turn, be analyzed in terms of detailed impact on the livestock subsectors. This analytical capability, anticipated to be "on-line" in FY '79 will be of significant value in answering policy questions, projecting future meat production and prices, and providing accurate assessments of the meat outlook and situation.

Dairy Farm Income

Accurate measures of farm income are needed for farm policy development and program administration. Several detailed components that can be used to develop a dairy farm income series are now available. The 1974 cost-of-production study completed by ERS has been updated and will be current through 1977. In addition to detailed information on costs and returns for major dairy production areas, this study also provides data on enterprise organization and farm structure. Typical farm budgets have been developed for use in the Firm Enterprise Data System. Three years of dairy enterprise cash flow data is now available for the Northeast from the Electronic Farm Accounting (ELFAC) system. This system is being expanded to include dairy farms in the Midwest. During FY '78, these components will be integrated with dairy farm revenue data to develop an accurate and current dairy farm income series.

FARM STRUCTURE, RESOURCE USE, AND PRODUCTIVITY

Examples of Program Results, FY '77

Cost of Production

Regional and national milk production costs were updated and reported in "Cost of Producing Milk in the United States, 1975 and 1976," Senate Committee Print, February 1977. A preliminary report on product costs for cow-calf systems was completed in June 1977. Production-cost data for swine are in the publication process, and a report on costs for cattle feeding enterprises throughout the Nation is being prepared.

Work on costs of production for crops included updating of cost estimates for major crops, and publication of a report "Cost of Producing Selected Crops in the United States--1975, 1976, and Projections for 1977," Senate Committee Print, January 1977. Cost-of-production surveys for sugar beets, potatoes, tomatoes, and burley tobacco were completed. A preliminary report on production costs for sugar beets and tobacco is planned for completion in December 1977, and reports for tobacco, potatoes, and tomatoes in February 1978.

In other cost-of-production work, about 500 budgets in the Farm Enterprise Data System (FEDS) were updated and distributed to users, including extension workers and researchers, commercial firms, Federal Land and Farm Credit Banks, Soil Conservation Service (SCS), and consulting firms. Over 100 livestock budgets were entered into the system and reviewed within ERS. These budgets will not be distributed until the hog and beef production-cost manuscripts are published. Work on whole farm budgets and "typical farms" representing agriculture in major production regions continued. The first issue of the typical farm series is scheduled for release in the spring of 1978.

Flue-cured Tobacco Mechanization

A study to project flue-cured tobacco harvest mechanization and the impact on labor to 1980 was completed in FY '77. Analysis of a wide range of quota levels and wage rates shows that the rapid trend toward harvest mechanization experienced in 1972-75 will continue into the eighties. By 1980, it is expected that 65 to 92 percent of the flue-cured, tobacco crop will be bulk cured and 17 to 30 percent harvested mechanically. The future size distribution of flue-cured tobacco farms, degree of harvest mechanization, and consequent effects on harvest labor will depend to a large extent on the size of tobacco quotas and wage rates. During the 1972-80 period, the decline in harvest workers is projected to range from 64,000 (with a high level of production) to 199,000 (with a low level of production). However, for the low quota situation, about 70,000 of the workers are displaced because of the need for fewer workers to produce a smaller crop. A report, "Flue-Cured Tobacco Mechanization and Labor: Impacts of Alternative Production Levels" was published in April 1977.

Energy Research

ERS completed and published in cooperation with the then Federal Energy Administration (FEA) a report titled "Energy and U.S. Agriculture: 1974 Data Base." The information presented in the report was developed to satisfy essential information requirements of legislators, policymakers, researchers, and conservation strategists. The data base was structured to allow disaggregation in five dimensions: energy, geography, commodity, time, and functional use. The report is the most comprehensive compilation of energy data on agricultural production that exists.

Five handbooks informing farmers, orchardists, and ranchers how to conserve energy in their production activities were also researched and published by ERS for FEA.

Analyses of the Structure of Manufactured Input Industries

Two reports have been developed detailing the structure of the nitrogen fertilizer industry, and the technical factors of production for the industry including quantity of inputs used, industry capacity, and degree of industry integration.

A survey was conducted of the feed mill industries, and a draft report on survey results is being prepared. The report will provide information on the number, size, and location of firms, and on the quantity of feed materials produced in 1976.

Impacts of New Tractor Technology on Structure and Costs of Farming

Analysis of replacing two-wheel drive and track laying tractors with four-wheel drive tractors on Pacific Northwest, Great Plains, and Cornbelt cash grain farms indicates that adoption of the four-wheel drive tractor will increase farm size. It also will cause a decreased demand for labor. Approximately 81 percent of the farmers who can economically use the four-wheel drive tractor will displace labor in the process of adopting the technology. The adoption of the four-wheel drive tractor also will reduce operating costs. For the three areas studied, the total savings in yearly operating costs would be approximately \$46 million. In addition, there would be a one-time savings of \$107 million.

Relationships Between Contract Production and Size of Agricultural Enterprises

Farmers must adjust to changing marketing conditions, including the trend to more intensive use of contracts in marketing agricultural products. A study was undertaken to estimate the importance of various types of first-handler markets, including contracting, and the relationship between the various types of markets and the size of farms utilizing them in the rolling plains of Texas.

The use of both crop and beef cattle contracts are associated with the larger producing units. This suggests that larger farm operators either are more active and aggressive in seeking contracts, or have advantages in being able to obtain contracts.

This has implications for structural changes and adjustments in agriculture. In the event contracting leads to lower marketing costs, more efficient marketing, or lower marketing risks, the larger producers may have advantages in terms of growth and development of their farm operations.

Interagency Coordination of Technology Assessment

ERS and the Agricultural Research Service (ARS) have entered into a new memorandum of understanding to jointly develop projects on the assessment of technology in the food and fiber system to provide (a) information for allocating research resources more in conformity with national priorities, (b) an early warning system for use in identifying problems prior to their occurrence, and (c) a knowledge base for monitoring the use, and measuring economic and other consequences, of new or existing technologies.

Progress on research includes:

Feeding crop residues and wastes to cattle.--A study was initiated during the year to estimate the technical and economic feasibility of increased use of crop residues and wastes in cattle rations. If feasible, the study also would assess the major impacts in terms of change in forage and grain production for feeding cattle, soil conservation, environmental quality, quality of meat products, consumer prices, farm program costs, and exports. Progress to date includes near completion of an inventory of the types, amounts, and locations of crop residues potentially available for cattle feeds, and development of plans for estimating technical and economic relationships in substituting crop residues for grains and forages in cattle rations.

Energy from anaerobic digestion.--An assessment of the technical and economic feasibility of anaerobic digestion to produce energy and other products from animal manures was completed during the year. A draft of a manuscript for publication is under review. Principal results of the study were: (1) anaerobic digestion systems are technically and economically feasible if designed and operated in association with large-scale dairy or cattle feeding operations (1,000 or more head annually), (2) the technology is not now economically feasible on most American farms, and (3) anaerobic digestion cannot be expected in the foreseeable future to contribute significantly to national energy supplies. Significant increases in the economic feasibility of anaerobic digestion will require much lower cost systems for small scale operations than now exists, and/or greatly increased environmental costs of concentrations of animal manures.

Use of solar energy in heating, curing and drying.--A review of the current status of knowledge and of research in progress on solar energy technology for agriculture is nearing completion. Research projects being carried out relate primarily to five types of applications of solar energy: (1) drying grain, (2) heating poultry houses, (3) curing tobacco, (4) heating livestock shelters, and (5) heating and cooling greenhouses. Preliminary analysis indicates that use of solar energy in poultry brooding, certain systems of grain drying, and tobacco curing are nearly competitive with the higher-cost, conventional energy uses. The potential direct and indirect impacts of applying solar energy technology for these purposes are expected to be substantial and widespread. The study now will focus upon those impacts.

Selected Specific Objectives for FY's '78 and '79

Assessment of Status and Impacts of Agricultural Sciences and Technology

This study is intended to assemble and place in perspective what is known about technological progress in agricultural production, processing, and marketing, as well as the recent and current major impacts of that progress both within and outside the food and fiber system. The major purposes are to assess the knowledge and technological bases for sustaining high rates of increase in production and productivity of the food and fiber system, while limiting indirect (especially adverse) consequences to socially acceptable levels; to enhance understanding of the nature and significance of the indirect environmental and social consequences of technology; and, to improve the information base used in determining agricultural research and technology assessment needs and priorities.

About 50 technical reports will be developed which will describe existing technology, trace the major recent scientific and technological developments underlying the present "state of the arts," identify significant direct (intended) and indirect (unintended) effects of the technology in use, assess the state of adoption of existing technology (i.e., potential for increased adoption), assess the prospects of achieving various (selected) technological targets through added R&D (including identification of scientific and technological gaps), and estimate the potential direct and indirect consequences of achieving those targets.

The study will be an interdisciplinary effort with contributions from experts located throughout the agricultural research system. Significant progress is expected in FY '78 with completion of the work in FY '79.

Multiple Ownership in Farming

Farms under multiple ownership will continue to increase in importance, and in a decade these farms may account for more than half of U.S. farm production. The research will center on the use of partnership and corporate forms of organization to aid in intergenerational transfer, assembly of capital, and expansion in size of operations. The special

features of partnerships and corporations can have strong implications for the future structure of farming primarily through impacts on number and size of farms, opportunity for entry, capital structure, and access to markets. Expected completion date: 1979.

Small Farm Research

There has been a growing interest in the problems of small farmers, and increased debate about Federal policies to aid them. The structural adjustment occurring in agriculture has resulted in an exit of small operators, yet almost two-thirds of the remaining farmers are small-scale operators. Although this large number of people produces only 11 percent of our food and fiber, this quantity becomes significant if viewed in terms of the low elasticity of demand for farm products. Small farms are found in every state. As a group, they are a very diverse set of operations.

From current census and other secondary data sources, small farms are being identified and classified by geographic regions, types of commodities produced, resource ownership, amount of nonfarm income, and other factors. Additional work is being undertaken to determine the optimum combination of resources on small Louisiana farms. The information from these studies will be of use in the design of future programs to increase the opportunities of small farmers. Expected completion date: 1978.

History of Farm Definition

A major paper on this subject will be completed in draft during FY '78 and should be published in FY '79. It will point out some of the problems in farm definition, and will explore in depth the development of the family farm concept in the United States.

Assessment of Solar Energy Use in Agricultural Production and Processing

This study is designed as an initial and exploratory economic assessment of current and prospective solar energy technologies. Its basic purpose is to assess the economic feasibility and potential consequences of the adoption of solar energy technology for selected heating, drying and curing applications in agriculture.

In response to the energy crisis, a substantial effort is underway in ARS and various state experiment stations to develop technologies for using solar energy in a number of agricultural applications. A rather broad spectrum of applications is being considered, including drying of grain, forage, peanuts, and animal wastes; greenhouse heating and cooling; poultry-house heating; process water heating; tobacco and onion curing, and farm-residence heating and cooling. This work needs to be supplemented by appropriate economic analyses and assessments of the

direct and indirect impacts of the technologies being developed. Such analyses and assessments would assist research managers in determining the magnitude and direction of research and development activity for solar energy.

The output will consist of a series of reports appraising the feasibility and potential for adoption of solar energy for selected application, and an overall report analyzing impacts. A report now being prepared describes the technology, and summarizes the status, of technical and economic research. Other reports to be prepared in FY '78 will encompass the technical and economic feasibility analyses of selected uses. A third overall report, to be prepared during FY '79, will summarize the results of the entire study.

Industrialization of U.S. Agriculture

A study of the industrialization of agriculture, with special reference to larger scale Pacific Northwest irrigated farming and Southwest commerical cattle feeding will be initiated. The study is designed to develop basic information on the economics of largescale "industrialized farming operations," and provide a comparative analysis of these operations with traditional "family" farms engaged in the same kind of agricultural production with respect to differences in operational and financial characteristics, internal structure, and factor and product market linkage. The comparative advantage of the two types of firms will be evaluated, and the impact of these advantages on the structural development of the food and fiber system assessed. Areas in which either type of firm may have a comparative advantage include production efficiency, product and factor market linkages, access to financial markets, risk bearing capacity, and ability to adjust to changing factor and product market conditions. Reports on the operational and organizational characteristics of industrial and independent owner-operated types of farm businesses will be finished by October 1979. The project will be completed in 1981.

Use of Contracts in Coordinating Farm Production

Production and marketing contracts are an increasingly important means of coordinating farm production with other stages of the food and fiber system. ERS, with the cooperation of the Census Bureau, has undertaken a study to assess the use of contracts between farmers and buyers of agricultural products. Various contract terms will be evaluated with respect to their influence on shifting decisionmaking control from the farm to the off-farm stages of the food system. Expected completion date: 1979.

Burley Tobacco Farms

Controversy abounds concerning the production and consumption of tobacco products. Central to this issue are questions relating to smoking and

health, tobacco price support programs, and the welfare of small tobacco farmers. In FY '78, ERS will complete a study on the structure and viability of burley tobacco farms. Major objectives of the study are to determine the size distribution of production units, evaluate dependence on tobacco, appraise the impact of alternative program changes, and project the future structure of burley tobacco farming. Detailed cost and return data will be available for major burley regions.

Interaction of Farmer and Lending Office Attitudes Toward Risk

It is hypothesized that lending officers' perceptions of the riskiness of some commodities is greater than the perceptions of the producers. Due to the heavy dependence of growers on bank financing for operating capital, the lending officers' assessment of risk can be the controlling factor in the cropping pattern that emerges in a region, to some extent farm income, and the rate of growth of the farm firm. A study is being undertaken to estimate grower and lending officer perception of riskiness for several commodities, and to determine the coefficient of risk aversion for producers and agricultural lenders. This risk aversion coefficient will be related to the rate of loan application rejection within specific lending institutions. Other variables, such as age, experience, agricultural background, and training, will be analyzed with respect to loan rejection rates. Finally, techniques for predicting the probability of loan rejection using such variables as financial position of the firm, experience, and riskiness of the crop mix will be developed. Expected completion date: 1979.

Cost of Production

Annual publication of regional and U.S. cost estimates for 10 major crops is planned for January 1978. Estimates of final 1976 costs, preliminary 1977 costs, and projected 1978 costs will be included. Additional data collection and improvement of existing data used for making cost of production estimates will be continued during FY '78. Data acquisition to be undertaken include surveys of: (1) peanuts production costs, (2) fertilizer use on sorghum, corn, soybeans, cotton, and wheat, (3) custom application costs for chemicals on cotton, (4) grain drying and grain storage costs, and (5) irrigation costs. During FY '78, the enterprise cost data will be used in the continued development of a typical farm series. The typical farm series will provide information on capital investment, enterprise organization, labor utilization, and value of production, and an analysis of costs and returns on typical operating farms. Publication of the initial typical farm summary report is planned for spring 1978.

FORECASTS AND PROJECTIONS

Examples of Program Results, FY '77

Current Situation and Outlook

During the past year, 51 commodity situation and outlook reports were published, plus 11 issues of Agricultural Outlook, 4 issues of the National Food Situation, and 11 Agricultural Supply and Demand Estimates. In addition to providing information widely publicized on the current situation and short-term outlook, these publications contained many special articles focusing on particular issues within specific commodity subsectors. The ERS staff also answered many questions from the Department and other Federal agencies, the Congress, industry, the press, and individual farmers and consumers relating to situation and outlook matters.

In the past year, ERS has made a concerted effort to expand the outreach of its outlook intelligence to the U.S. public. All situation report summaries and Agricultural Supply and Demand Estimates reports are now fed into a computer network that relays information to all Statistical Reporting Service (SRS) and Extension Service (ES) field offices. This allows both Government agencies and public clients access to the information. A "Farmers' Newsline," a toll-free phone number which roughly 500 users call each day to receive current outlook information has been established. In addition, outlook information is being released via the Agricultural Marketing Service's (AMS) Market News reports. This is a leasewire service that reaches just about every sector of the food and fiber industry, and has a potential audience of well over 100,000. More outlook information is included in radio and television consumer news items. These outlets have a potential audience of 120 million.

Documenting Forecasting Methodology, and Evaluating Performance

The Economic Research Service is developing a comprehensive econometric forecast modeling system to assist in analyzing the agricultural sector. Work was completed during FY '77 to document and explain the modeling system both in terms of how the sector models link for cross-commodity analyses as well as specific structural equations. This included preparing: (1) flow charts which document the variables for each model; and (2) a report which documents the structure and equations in the feed-livestock sector model including key impact multipliers. Reports were also prepared to document and expand or update the structure of the existing system, including: (1) acreage response equations for corn, oats, barley, sorghum, soybeans, and wheat, (2) the wheat modeling system, and (3) the feed grains model. ERS initiated a program of forecast evaluation several years ago. A report on 1977 performance indicates ERS forecasts have improved. For example, forecasts of the index of prices received by farmers for all commodities made for one year ahead have been within about 2 percent of

the actual index for the past two years. Last year (1976), food price increases were estimated at 3-4 percent; the actual increase was 3.1 percent.

Development of an Aggregate Agricultural Forecasting Model

Fiscal year 1977 saw the development of a prototype forecasting model for agricultural aggregates including cash receipts, farm operating expenses, farm income, wholesale prices, and retail prices for food. The forecasting model can be used separately or linked to the macroeconomy via the food price component of the Consumer Price Index (CPI). The model incorporates the impact on the agricultural sector of macroeconomic variables such as real per capita income and cost components of agricultural inputs.

Agricultural Projections for use in Regional and National Agricultural Research Planning

A series of working papers on food and agricultural projections to 1985 were completed as part of ERS's contribution to the Regional and National Agricultural Research Planning System's 1977 research planning process. Three alternative futures for U.S. food and agriculture in 1985 were based on likely growth ranges in important variables impacting the supply and demand for major commodities and aggregate farm output. The baseline assumed moderate supply and demand conditions. The toward-scarcity bound assumed high demand and low supply conditions with adverse weather. The toward-abundance assumed low demand and high supply conditions.

Despite the relatively short supplies and high commodity prices of the early 1970's and publicly expressed concerns about the future of food and agriculture, analysis of the projections indicate there is a 70 percent chance that the U.S. food and agricultural complex will adjust within a very manageable range of supply-demand conditions through 1985. The analysis also indicated only a 13 percent chance of such high supply and low demand conditions pushing food and agriculture toward abundance with excess supply pressure, and only 17 percent chance of moving toward food scarcity. No alarming long-run growth patterns emerged in the planning horizon to 1985.

The terms of trade are not expected to turn in favor of the farmer. Net farm income as a percent of Gross National Product (GNP) is expected to decrease from 2.09 in 1973-75 (relatively high farm income periods) to 2.04 percent in 1985 under the baseline assumptions. It could regain its 1973-75 positions only under conditions such as those simulated at the toward-scarcity bound.

Selected Specific Objectives for FY's '78 and '79

Current Situation and Outlook

ERS will periodically develop and publish analyses of the outlook and situation for agriculture and specific commodities as described above for FY '77. This effort will be supported by special analyses, examples of which are listed in the remaining items.

Interactive Dairy Models

Most of the dairy data base utilized by ERS analysts is now automated. Automation will be completed and interactive procedures developed and utilized to support the outlook and situation work, contingency analysis, and special request studies. The quarterly dairy model will be expanded and validated to generate more accurate forecasts on a timely basis. This model is structured to simulate the industry as currently organized and includes equations to represent: (1) government pricing policy, (2) producer behavior, (3) processor-retailer behavior, (4) consumer behavior, and (5) government purchase activity. Emphasis will be placed on developing a user oriented on-line system that can be used for outlook and policy analysis on a quick-turn-around basis. A user's operating manual will be prepared, and a technical description of the updated system will be published in bulletin form.

Supply and Demand for Grains

Studies of the industries, unique product characteristics, and factors influencing the production and marketing of barley, oats, wheat, and rice will be completed during FY '78. This series of studies will provide descriptive reports on the economics of producing and marketing grains. This background information will serve as the basis for a second series of analytic studies focusing on the quantitative relationships in grain production and marketing. Results of the analytic study for rice will be published in 1978. Work will be initiated for the other grains during FY '78. The analytic studies will involve the specification of simultaneous econometric systems, and estimation of their parameters. These systems are being developed for short and intermediate term forecasting of supply, demand, and price, and for the analysis of alternative grain policies.

Yield Variation for Grains and Cotton in the U.S.

A large part of the fluctuation in prices of agricultural products and farm incomes is attributable to variations in yields. Consequently, yield uncertainty is a major factor in agricultural decisionmaking at the public policy and individual farm levels. To make the best decisions at either level requires information not only about the average or most likely yield, but also the full range of possible yields, from lowest to highest, and the probability of each.

By analyzing data on yields and related variables over extended historical periods at the state, county, and farm level, this study will provide a consistent and reliable basis for making statements about yield probabilities from 1 to 5 years into the future. Reports on wheat, feed grains, and cotton will be prepared by the end of 1978.

Aggregate Forecasting

Work will be continued to improve aggregate agricultural sector models and integrate these into a forecasting tool for farm income, market basket statistics, and wholesale and retail farm and food prices. Effort during the first half of the fiscal year will concentrate on the development of an information system consisting of maintained historical and forecast data banks, an operating system, and facilities for writing and editing reports. The second phase will involve the integration of an agricultural sector - macroeconomic model combination into this system as an analytical tool attached to both data banks and the operating system, and through the operating system to the reporting facilities. The third phase consists of linking the aggregate agricultural models to other ERS maintained models such as the Cross Commodity Forecasting System. The bulk of this work is expected to be completed by the end of FY '78.

Agricultural Credit and Flow-of-funds

An aggregative flow-of-funds projections model will be completed and tested under alternative scenarios. The model will be useful to those interested in future credit needs for the sector under alternative policy scenarios. Basic components projected by the model will include income flows, debt flows, stocks of debts, and assets. It is anticipated that the project will be completed by July 1978.

Demand for Livestock Products

ERS has placed high priority on commodity demand studies to meet the continuing need for detailed and up-to-date measures of demand parameters such as price elasticities and flexibilities. During 1978, procedures and techniques required to estimate a complete demand system with emphasis on components of the livestock sector, including dairy products, beef, pork, and poultry, will be developed, implemented, and evaluated. The study will utilize a nontraditional approach to demand which focuses on estimation of complete systems of demand parameters. This approach shows promise and potential for obtaining detailed and consistent demand estimates that can be readily updated.

MARKET STRUCTURE AND PERFORMANCE

Examples of Program Results, FY '77

Simulation of U.S. Corn Wet-milling Industry

High-fructose corn syrup (HFCS) has become a major element in the domestic sweetener industry. Announced investment plans suggest 1980 HFCS production could displace as much as one-fourth of total sugar use (3 million tons). This represents about one-half of present domestic sugar production. The implications of HFCS growth extend to all segments of the sweetener industry, and bear on the feed grain and feedstuff complexes as well. Domestic sugar beet and sugarcane producers are particularly concerned about increased HFCS competition and its impact on profitability and resource allocation. Related expansion of HFCS byproduct production (corn oil, gluten, etc.) suggests changing competitive relationships in these markets as well. Key factors in HFCS growth potential are corn prices, sugar prices, and wet-milling costs. Little is known about costs as the industry has been unwilling to make this information available to the public. To fill this information void, a study was initiated to synthesize HFCS production techniques and costs through economic-engineering methods. The study is being conducted in cooperation with Purdue University, and will continue through FY '78. The first phase of the study focuses on the technical processes of conversion of corn into high fructose corn syrup, byproducts production, energy balances, and emerging technologies. Since new generation or higher fructose levels of HFCS are rapidly evolving, the incorporation of technology required in their production is being incorporated so that cost estimates, to be added during the second phase of the study, will more accurately reflect the costs of wet-milling firms.

Cotton Basebook

A draft of a basebook of the cotton industry was completed during FY '77. This report provides a description of the various stages and functions performed in producing cotton and in delivering it to the mill or port. The basebook is the initial output of a project to develop an overall model of the cotton industry in which all phases of the industry, from production to consumption, are quantified. Plans are to develop quantitative data relating to structure, resource use, and costs of functions performed at the various stages in the system from production to the mill.

Automated Cotton Fiber Test Line

During FY '77, ERS completed the first phase of a comprehensive 5-year field evaluation of automated instrument testing of cotton. This project was a major recommendation of the National Cotton Marketing Study Committee, a USDA-industry advisory committee. It involves an interagency (ERS-AMS-ARS) effort to apprise cotton industry acceptance and use of new measures of fiber quality which better define cotton's end-use value. Since 1976, data have been collected and

summarized for each marketing season to determine the degree to which these measures are used by producers and ginnery in marketing cotton, by merchants in purchasing cotton, and by textile mills in the utilization of cotton. Information has been collected and summarized for the 1976/77 season, and a draft report has been prepared for publication. Surveys for subsequent crop years (1977-1980) will focus on changing attitudes toward these new measures, and their current and potential impacts on the cotton marketing system.

Effects of 1976 Beef Grade Changes

An ERS analysis of beef price data published in FY '77 indicates that the new beef grading standards adopted early in 1976 have widened the price differential between quality--yield grade combinations, but the overall demand for beef has not been affected. This conclusion sheds light on a controversy which began when the grade change was proposed. The results are very timely, as the Department of Agriculture is being pressured to modify or abolish the new grade standards. The study is based on an econometric covariance analysis of wholesale meat prices collected at four major markets before and after the grade change. A wider range of premiums and discounts between grades serves to better reflect payments to producers for production of animals whose carcasses are of more value, thus guiding future production decisions. The study illustrates the analytic support which ERS can provide for other USDA agencies.

Grain Standards

During FY '77, the Economic Research Service participated with the Federal Grain Inspection Service (FGIS), AMS, and ARS on a task force to evaluate the official grain standards of the United States. The overall objective is to determine the adequacy of current grain standards in providing for orderly and efficient marketing of grain. The Task Force has reviewed the grade determining factors currently in the standards, and has considered additional factors which it may be desirable to include. Criteria for establishing the adequacy of the grain standards have been discussed. Grades and standards should certify information which will enable buyers and sellers to complete transactions efficiently and fairly. However, the cost of providing the service and the accuracy of the grading also must be considered. The operational efficiency of the grain inspection system is dependent upon the number of factors which must be evaluated. Thus, it may not be feasible to incorporate a desirable factor in the standards, because its inclusion would impede the operational efficiency of the system and increase costs beyond an acceptable level.

The task force has identified many of these issues associated with the present grain standards, and has discussed possible means of resolving them. During FY '78, alternative solutions will be evaluated to determine whether or not these proposals would improve the present grain standards. It is anticipated that a report will be completed in FY '78. ERS will assist by providing analyses of the economic impact of any recommended changes.

Improvements in Farm-retail Price Spread Estimates

The report of the 1976 AAEA-ERS task force on farm-retail price spreads which presented ideas and recommendations to strengthen the price spread and related marketing statistics has been carefully reviewed. Many of the recommendations will be incorporated in the new market basket series, but will not require major changes in this work. One of the strongest suggestions made by the task force was to develop a new series on retail margins. To accomplish this objective, a contract was let with a private research firm to develop a data bank from accounting data to provide retail prices, margins, and movements for about 250 categories of items handled by grocery stores. The contractor is currently soliciting industry cooperation.

Work has begun on rebasing and revising market basket statistics to reflect recent consumer purchase patterns, and to key it with revision of the CPI being undertaken by the Bureau of Labor Statistics (BLS). Technical problems have delayed the CPI revision; however, the market basket revision should be completed within the 6-month overlap period following the initial release of the new CPI. All aspects of the market basket statistics are being reevaluated for possible improvements to better reflect current conditions and structure of the food production and marketing system. A part of this work includes updating the conversion factors used to derive farm values for the foods in the market basket. A report "Conversion Factors and Weights and Measures for Agricultural Commodities and their Products" is being prepared, and will be published later this year.

Identification of Concentration and other Structural Characteristics in Food Retailing

Structural characteristics of the food retailing system in each of the 263 Standard Metropolitan Statistical Areas (SMSA) has been obtained through a special Census tabulation of grocery store data in the 1972 Census of Retail Trade. These tabulations include information on size and number of establishments and firms in each SMSA. Information is reported separately for the central city, suburbs, and total SMSA. Information on sales, payroll, square footage, number of employees, and store openings and closings are available by store and firm size. Sales concentration ratios for the 4, 8, and 20 largest firms are reported separately for small grocery stores, supermarkets, and all stores.

This information on food retailing has become available at a time when there is considerable public interest and questions regarding the competitiveness and performance of our food distribution system. A summary report is nearing completion which includes 4, 8, and 20 firm concentration ratios for food retailing firms for census years 1954, 1958, 1963, 1967, and 1972, and shows changes in concentration ratios between years. Data from the special food retailing tabulations provided an essential input in a report of the Joint Economic Committee of Congress, "The Profit and Price Performance of Leading Food Chains,

1970-74," prepared by University of Wisconsin economists. Also, the data have been used to address problems of food retailing in inner city areas with predominately low-income residents.

A paper entitled "Structure of Food Retailing in Central Cities and Suburbs of Large SMSA's," comparing the characteristics and performances of city and suburban food retailing systems in selected SMSA's, was presented to the Conference on Problems of Inner City Food Distribution.

Examination of Possibilities for Direct Marketing from Farmer to Consumer

The "Farmer-to-Consumer Direct Marketing Act of 1976" (P.L. 94-463) provides support for the development and expansion of direct marketing of agricultural commodities from farmers to consumers. Section 4 of the law directs ERS to conduct surveys to determine the extent of direct marketing of farm products and its impact on returns to farmers, particularly small farmers, and cost of food to consumers.

In response to the provision of the act, ERS has reviewed alternative methods or procedures for measuring the extent of direct marketing by method of sale and product type. Plans for surveys in FY '78 have been developed for review. A search of the literature on direct marketing has been completed. Written or telephone contacts with either ES marketing specialists and/or Department of Agriculture representatives in all States to solicit intelligence on direct marketing have been completed. A report on the extent of direct marketing based on secondary data is being prepared for inclusion in an annual report to Congress called for in the Act.

Sponsorship of National Symposium on Transportation for Agriculture and Rural America

A National Symposium on Transportation for Agriculture and Rural America was cosponsored with the offices of University Research and Rural Transportation Policy of the Department of Transportation, State Agricultural Experiment Stations, Cooperative State Research Service, Farm Foundation, and Upper Great Plains Transportation Institute. Papers on about 40 research projects on rural transportation demonstration programs were presented and are being published in the proceedings of the symposium. Discussion among the 230 attendants from all areas of interest in rural transportation helped to highlight knowledge deficiencies and new problems.

Study of the Roles of Automobiles and Small Trucks in Rural Transportation

Analysis of patterns of control of automobiles and light trucks by farmers showed that nearly all farm households in 1974 had access to one or more such vehicles. In some farm production regions, farm business mileage was nearly as large as mileage for all other purposes. But in others, notably the Delta and the Southeast, off-farm employment and family use accounted for most of the vehicle miles. Farm and other

non-SMSA households use automobiles and light trucks more than do SMSA households. Despite better fuel efficiency of automobiles in rural uses, non-SMSA households purchase more gallons of fuel per year, and thus face larger welfare losses from increased fuel prices than do SMSA households. Also, alternatives for reducing miles of use of privately operated vehicles in response to future fuel price increases appear to be less feasible in rural than in urban areas.

Selected Specific Objectives for FY's '78 and '79

Farm-Retail Price Spreads

Throughout the planning period, ERS will regularly prepare, analyze, and publish estimates of the market basket, marketing bill, and related major statistical series on food marketing. The market basket statistics, which are used to analyze and forecast retail food prices, will be revised to incorporate new food expenditure cost weights and retail prices into the estimating procedures. These revisions are necessary to maintain consistency with the revisions being made in the food component of the CPI. Timing of the revisions will depend on the availability of data from BLS and the release of the revised CPI which is now scheduled for July 1978.

Agriculture's Transportation Requirements

Agriculture has complex transportation requirements that can easily mislead transportation planners. Among characteristics seemingly overlooked at times are: low density production leading to lengthy assembly routes; seasonality of harvests, creating heavy demands at harvest times and low demands at others; some cycling in demands due to the nature of livestock production; sporadic pressures on transportation brought on by droughts and crop failures in foreign countries; and perishability of certain agricultural products that necessitates high quality transport service in terms of timeliness, speed, and climate control.

Work is underway to illustrate the aggregate nature of agriculture's demand for transportation by type of equipment, season, and region for historical periods. Special attention is being given to farm-to-first-market movement of all agricultural products; seasonal flows of fresh fruits and vegetables between production regions and consumption points by mode of transport; and seasonality of transportable surpluses of the dry bulk commodities by state. The work is to be completed in FY '78.

Input-output Model for Fiber and Oil Crops

Interrelationships between the fiber and oil industries and other sectors of the economy are numerous and complex. Events in the fiber and oil sector significantly affect economic activities in other sectors. In FY '78, an input-output model will be developed to analyze production, processing, and distribution of major fiber and oil crops on a regional

basis. The completed model will be used to examine the effect on inter-industry transactions, employment, and employee compensation of changes in technology, final demand, and government policy. Energy production and use will also be analyzed.

Extent and Economic Implications of Direct Marketing of Farm Products

Surveys will be carried out in selected States where direct marketing appears to be significant to determine the volume of sales made directly to consumers by producers, and through various types of outlets, the impact of the direct sales on producer returns and consumer food costs.

Implications of Procurement Practices of Food Retailers

Food product procurement practices of selected retail firms will be identified and described, and their impacts on other market participants studied. Emphasis will be placed on procurement practices for processed fruits and vegetables, their effect on vertical coordination of the fruit and vegetable subsectors, and the structure, behavior, and performance of fruit and vegetable processor-manufacturers. Results will contribute to better understanding of who controls our food and fiber system, how this control is exercised, and the implications to wholesalers, processors, and farmers.

Market Channels for Meat

Market channels for beef, pork, and lamb from slaughter to consumer have not been updated since 1955. However, there have been substantial changes in technology and wholesale market practices during the past 20 years. Public interest is focused on the cost justification of the marketing margins associated with this important segment of the meat industry. In FY '78, ERS economists will conduct a pilot market-channels study in a major metropolitan area. This study will confirm the kind of sample and survey technique needed to conduct a national survey in FY '79. Bench-mark data from the survey will provide the basis for cost analysis of meat marketing with emphasis on numbers, sizes, types of markets, normal procurement and distribution channels, costs of operation, and returns to management.

Survey of Food Service Industry

Data from a national survey of the market for food away from home are scheduled for analyses and reporting. Information will reflect changes and trends in structure and organization of the food service industry. It will show the operational characteristics of establishments which comprise the industry, as well as detailed statistics on quantities and values of individual foods used, on a commodity basis. Analyses will provide for the first time, information on the changing nature,

size, and food demands of this market. It will measure dimensions and growth of the market for food consumed away from home, interpret changes and trends in structure and organization of establishments that provide food service, and appraise the economic implications and impacts of these changes on producers, agencies of the product market, and consumers. The survey is being conducted by the food industry, but ERS is providing a national sample of food service outlets, technical advice, and counsel on request. A report is planned for September 1979.

Energy Used in Food Processing

A data base is being developed on the use of energy in food processing. It is anticipated that this data system will provide the most comprehensive collection of data relating to the processing segment of the food and fiber sector. In addition, a simplified national model of the U.S. food system will be completed in FY '79 to facilitate response to energy policy questions and issues. Longer-term research will contribute to the development of a more complete modeling of the food processing sector that will provide the capability for analyzing the impact of energy price changes on the processing sector.

AGRICULTURAL TRADE AND POLICIES

Examples of Program Results, FY '77

Current Situation and Outlook for U.S. Agricultural Trade

Successive years of record U.S. agricultural exports and very substantial agricultural trade surpluses have been offset by energy imports that have been a serious drain on the U.S. balance of payments. This has increased public awareness of the sensitivity of U.S. agriculture and the U.S. economy to agricultural developments overseas. It also has intensified public interest in the basic economic information and analysis provided by ERS on the current situation and outlook for U.S. agricultural trade and food aid. The three-times-a-year World Agricultural Situation and seven annual regional agricultural situation reports have provided a comprehensive review and analysis of current and prospective foreign developments as they affect the U.S. agricultural situation.

Analyses of both short- and long-term agricultural developments, together with short-term and intermediate forecasts of U.S. agricultural trade, are regularly made available to the public through several other ERS publications. The quarterly Outlook for U.S. Agricultural Trade, published jointly with the Foreign Agricultural Service (FAS), provides USDA's overall summary forecast of the value, composition, and direction of U.S. agricultural trade in the coming year. The monthly Foreign Agricultural Trade of the United States, and the calendar and fiscal year U.S. Foreign Agricultural Trade Statistical Reports provide more detailed analyses and information useful to those concerned with U.S. agricultural trade and food aid, including those seeking export opportunities. The semi-annual World Economic Condition in Relation to Agricultural Trade assesses the implications of foreign economic conditions and international financial and monetary developments on the demand for U.S. Agricultural products. The monthly Agricultural Outlook provides rapid dissemination of information and analyses on the wide range of topics discussed above.

World Supply, Demand and Trade Projections to 1985 and Beyond

A mathematical model is being used to update projections of production, consumption, and trade in the grain-oilseed-livestock sector by major countries and regions of the world under several alternative assumptions. Further improvements in the operational efficiency of the model, developed in FY '75, were effected to increase capability and flexibility of the model to test different alternative assumptions.

Additional alternatives studied in FY '77 included the impact of lower grain yields on the world grain supply-demand balance arising from the possibility of changing world climate. Further projections based on the year 2000 indicated the importance of increasing agricultural production in the developing world, and demonstrated the importance of the interrelationships in the growth of population, income, and agricultural production.

Some results for both 1985 and 2000 have been published, and several comprehensive reports dealing with aspects of the 1985 projections will be published in early 1978. Many organizations (public and private, national and international), have considered these USDA projections as basic starting points in their analyses of the world food situation. Among these users are the World Bank, the International Food Policy Research Institute, and the World Food Council. Industry has made use of the USDA projections to assess long range production plans. Results of the model with respect to oilseeds were used directly in a separate projections study for oilseeds and products. Results of that study were used by Congress and the National Advisory Council to develop a position regarding U.S. policy towards financing of palm oil production by International Financial Institutions.

Analysis of Foreign Markets for U.S. Agricultural Products

Research was initiated in FY '76 on a consistent and integrated set of foreign market studies to estimate the future demand for principal U.S. agricultural exports.

In FY '77, work was continued under cooperative research agreements and contracts on methodology and on in-depth country studies on Australia, Iran, Japan, Brazil, and Canada. Also in-house conducted studies, focusing on the grain-oilseed-livestock sector, were begun on the People's Republic of China, Sudan, Argentina, United Kingdom, France, South Africa, and Bangladesh.

All contract and cooperative research agreements and six in-house studies were completed and are being prepared for publication. These include: (1) production and trade supplies of wheat and coarse grains in Australia, (2) demand for feed grains in Australia, (3) Iran's import requirements of food and feed grains and oilseeds, (4) wheat import and price policies in Japan, (5) formula feed industry in Japan, (6) production and imports of food in Japan--an analysis of welfare cost of protection, (7) impact of a formula feed price increase on Japan's feed imports, (8) economics of Brazilian soybean production, (9) econometric analysis of Canada's grain-livestock economy, (10) grain, oilseed and livestock economy of the United Kingdom, (11) grain, oilseed and livestock economy of France, and (12) agricultural sector economy of Bangladesh, with emphasis on grain and oilseed import demand.

Information developed in this project should help U.S. officials in making a variety of program decisions with regard to U.S. domestic agricultural programs, U.S. foreign market development programs, and U.S. food aid programs.

Climatic Change and World Agriculture

An interdepartmental project was undertaken to identify the likelihood of a significant climatic change and the resultant effects on U.S. and

world food production, and on other issues affecting national policy to the year 2000. The Department of Agriculture is cooperating with the National Defense University, the National Oceanic and Atmospheric Administration, and the Institute For the Future (under contract supported by the Defense Advanced Research Projects Agency).

The first major task was to define climatic change and variability as clearly as possible, and determine the degree of consensus concerning expected changes in climate and its variability over the next 25 years. A request for views and opinions covering these issues was submitted to a panel of 30 climatological experts (United States and foreign). Their answers, expressed in quantitative (probability) estimates and qualitative judgments, have been analyzed and aggregated into "climate worlds," each with sets of features described by the respondents, each with corresponding perceived probabilities, and each with associated narrative scenarios.

Assessment of World Food Production and Needs in Relation to Potential Food Aid Requirements

A global assessment of food production and needs was completed for the Congress in response to the new provision of Public Law 480 which aims at providing information helpful to Congress in making food aid policy and program decisions. The report analyzed current food output in relation to past performance in the developed, centrally planned, and developing countries. The primary focus was on the lowest income countries (LIC's)--those with per capita GNP under \$300--that the law requires to be the recipient of at least 75 percent of Title I assistance. Special attention was given to the cereal and vegetable oil situations in the LIC's. LIC food requirements were estimated in terms of grain imports and potential levels of food aid needed to maintain the previous year's per capita food consumption levels, and in terms of the additional grain imports needed to meet the Food and Agricultural Organization's minimum recommended levels of per capita caloric consumption.

Conference on International Food Policy Issues

Economic Research Service sponsored a conference on international food policy issues which was held on April 28-29 in Washington, D.C. Over 250 invited participants from both public and private agencies of the United States and from abroad attended the 2-day conference to consider the international dimensions of food and agricultural policies. Some of the leading authorities from universities, international organizations, foundations, and private research groups presented papers on the following subjects: The "Food Gap" and National Self-Sufficiency; Food Aid and Malnutrition; Agricultural Trade, Preference, and Trade Agreements; and International Food Security. These recognized individuals were asked to explore carefully and critically the key issues, to analyze alternatives facing national and

international policymakers, and then to set forth their recommendations based on their own evaluations and expertise. A report on the conference is being published.

The convergence of so many eminent authorities was also used to conduct TV interviews which were then placed in the usual USDA and public affairs spots on about 40 stations. These interviews are also being made into a half-hour documentary which promises to be interesting and valid for some time to come.

A Strategic Review of U.S. Food Aid Programs

At the request of the Assistant Secretary for International Affairs and Commodity Programs, ERS undertook a review of U.S. food aid programs.

The review dealt with the food supply and demand situation in the developing countries and the implication of the situation for the U.S. food aid program. It examined the goals of the P.L. 480 programs; considers the relationships between food aid and supply management concerns; and discusses humanitarian and development uses of food aid and related policy and program issues.

Major conclusions of the report are: (1) an earmarked food reserve would insulate food aid from fluctuations in commodity supply, and reduce pressures to use food aid as a supply management tool, (2) multiyear programming of commodities would enhance the effectiveness of food aid provided for development or humanitarian purposes, and (3) providing food aid on a grant basis at least to low income countries would relieve their mounting debt burdens.

Soviet Feed-Livestock Economy

The article, "Soviet Agricultural Trade and the Feed-Livestock Economy," published by the Joint Economic Committee of the Congress in a compendium of papers entitled, Soviet Economy in a New Perspective, October 14, 1976, was the concluding of research commenced in FY '73. The article related Soviet policies and economic relationships in the feed-livestock area to grain imports during 1971-75, and looked at the implications of the apparent policies and feed-livestock economy relationships for grain, oilseed, and livestock product trade during 1976-80.

This and previous project reports provide a review of the evolving policies and relationships in the Soviet feed-livestock economy, and of their apparent and projected impact on Soviet grain and feed trade. They should be useful both to business and government officials interested in Soviet agricultural trade, and to students of Soviet economic policies and developments.

Analysis of the PRC's Foreign Trade and Financial Position

A series of articles in journals and reports analyzed trade and payments developments of the People's Republic of China in the 1970's.

The series provides a comprehensive analysis of total and agricultural trade of the PRC, including trade with the United States; an analysis and projection of the country's external position; and a review of her trade policy. A key article was "China's Foreign Financial Liabilities" (coauthored with U.S. Department of Commerce) in The China Business Review, March-April 1977. The PRC's foreign financial policies were reviewed, and foreign obligations tabulated and extended through 1980. The analysis concluded that repayment pressures through the rest of the decade will be significantly eased--following a high ratio of repayments to hard currency earnings in 1976--unless grain imports again rise sharply. The article also stressed the continuity of the PRC's conservative financial policies during the 1970's. The analyses should be extremely useful to business and government officials interested in trade with the PRC.

World Agricultural Production

A compilation of 27 years of world cereals production statistics by country was completed in FY '77. The data will facilitate both analyses of the impacts of various factors and developments affecting world trade over an extended period, and forecasts and projections of future developments.

Semianual world and regional agricultural and food production indices were computed and published. This project is part of a continuing effort to analyze the current agricultural production and food situation by country, by groups of countries, and the world.

Selected Specific Objectives for FY's '78 and '79

World Agricultural Situation and Outlook for U.S. Agricultural Trade

The World Agricultural Situation (WAS) will be released three times during each of fiscal years 1978 and 1979, supplemented by seven regional situation reports to be published in the spring of each year. The WAS will emphasize events that have both short- and long-term significance for both the world food situation and U.S. agricultural trade. The semi-annual World Economic Conditions in Relation to Agricultural Trade will consider the impact of foreign economic conditions, international monetary developments, and longer-term economic trends and policy developments on world and U.S. agricultural trade.

The monthly Foreign Agricultural Trade of the United States (FATUS) will provide analyses and detailed statistical indicators on the current situation and outlook for both commercial and concessional U.S. agricultural trade. Annual supplements to FATUS will provide comprehensive country and commodity statistics for U.S. agricultural trade on both a calendar and fiscal year basis. The quarterly Outlook for U.S. Agricultural Exports will continue to provide USDA's summary forecast of the value, composition, and direction of U.S. agricultural trade in the coming year.

1977 revisions in P.L. 480 require the Department of Agriculture to submit an annual global food assessment report to Congress to aid in its planning and administration of the U.S. food aid program. The report will be submitted to the Congress early in February 1978 for its use in reviewing program and budget proposals. The February 1978 global food assessment will evaluate world and developed, centrally planned, and developing country food production in 1976 and 1977, and--recognizing the limited data available early in the year--prospects for 1978. Particular attention will be given to countries with per capita gross national products below \$550, as the revised P.L. 480 requires that these lowest income countries (LIC's) receive at least 75 percent of Title I aid. The financial and nutrition situations in the LIC's and the rest of the world are also to be reviewed as they bear on food aid needs. Policy developments related to food aid and the broader question of world food security are also to be reviewed.

World Supply, Demand and Trade Projections to 1985 and Beyond

FY 1978 will see the publication of the main comprehensive reports of 1985 projections, and basic studies of technical aspects of the projections. High priority will be given to the design of sets of assumptions and their use for projections which highlight the interaction between critical regions of the world and the U.S. domestic agricultural economy. The model will continue to be used as needed for evaluating alternative policy sets in a world trade context. While projections will continue to be made to 1985, that year is becoming a borderline between medium-term and long-range projection. Accordingly, priorities will be raised to develop full capability for projecting the year 2000 and publishing the results. The White House, the World Bank, the International Food Policy Research Institute, the World Council, and others are expected to continue to regard USDA projections as a starting point in their analyses of the world food situation.

Trade Forecasting Methodology

During FY '77, methodology for a world trade forecast modeling system was developed. Plans include continued refinement and analysis of the existing wheat and coarse grain net trade models as well as development of net trade models for other agricultural commodities. The soybean net trade model that has been specified, estimated, and partially validated will be made operational. These net trade models each will consist of a system of export supply and import demand functions, by major market countries, solved simultaneously. Plans also involve the development and incorporation of associated source-destination trade flow models and detailed agricultural sector models for the major countries in the system. This system will provide a series of separate, but interrelated, models that systematically identify the important factors affecting production, consumption, prices, and trade that will serve as linkable components in a world trade forecast modeling system.

As soon as a model component becomes operational, it will be used to generate regular world agriculture and trade forecasts as part of the ongoing ERS outlook and situation activities.

Analysis of Foreign Markets for U.S. Agricultural Commodities, 1978

Scheduled for completion in 1978 are studies on (1) economics of Brazilian soybean production, (2) the United Kingdom agricultural sector, (3) grain, oilseed, and livestock economy of France, (4) development and trade potential of Sudan's agriculture, (5) factors affecting exports of Argentina's grain, oilseed, and livestock sectors, (6) agriculture sector of the People's Republic of China, (7) factors affecting trade of South Africa's agriculture, (8) food import requirements of Bangladesh, and (9) food and feed import requirements of South Korea. Also, new studies will be initiated on the agriculture sectors of Venezuela and Indonesia.

Analysis of Agriculture in Eastern Europe's 1976-80 Plans

Countries in Eastern Europe have been an important growth market for U.S. grains and other agricultural products. Insight about future production and consumption of these farm products is crucial to U.S. policymakers in public and private sectors. The 5-year (1976-80) plans announced by individual Eastern European countries provide the best available information on this matter. A study is currently underway to analyze planned growth of production and consumption of grain, feed, and livestock products. It will provide an important basis for anticipating the fundamental midterm direction of agricultural trade, and for other forecasting work on Eastern Europe regarding these commodities. Completion of the study is expected during the first half of 1978. The analysis, on a country-by-country basis as well as regional similarities, will be presented in a Foreign Agricultural Economic Report.

World Agricultural and Food Production

The data included in the compilation on world cereal statistics completed in FY '77 will be kept current, and will facilitate analyses of the impacts of various factors and developments effecting world trade and production over an extended period. The data also will serve as a basis for undertaking forecasts and projections of future developments, and represent the basis for analyses and publication of the semiannual world agricultural and food production indices. The indices will be revised in fiscal year 1979 to include an update of the base period, expansion of the commodity coverage, and an improvement of the price weights. Current indices show that per capita agricultural production in the United States, while very high, is rising more slowly than in other industrially developed countries.

Assessment of the PRC's Agriculture and Grain Trade

Since the death of Mao Tse-tung, the PRC's new leadership has shifted from an ideological to a more pragmatic economic posture. Policies on economy and agriculture all point to significant emphasis toward more rapid economic progress, and interfacing with the West for technology. Therefore, an indepth analysis of the direction and possible problems of PRC economic progress and grain trade will provide insight for policy decisionmakers on U.S. trade of agricultural products. Two studies are currently underway and expected to be completed by spring 1978: PRC agricultural performance in the 1970's and emerging agricultural issues, and PRC grain trade--1961-76. After the studies are completed they will be published as USDA contributions to the Joint Economic Committee publication on the assessment of the PRC economy scheduled for summer 1978.

P.L. 480 Concessional Sales: History, Negotiation, Considerations, and Implementation Procedures

Food aid has been an important part of U.S. foreign policy for almost two and one-half decades, and has been a significant factor in U.S. agricultural exports. A review of the history and policies of the P.L. 480 program is nearing completion. It covers the origin and history of Public Law 480, the general and specific considerations in negotiating P.L. 480 agreements, and the procedures for implementing the agreements. The information was developed specifically to aid U.S. Government officials associated with the P.L. 480 program, as well as for officials of other nations that receive aid through this program. It also should help private U.S. exporters who may wish to enter the program, U.S. and foreign private entities that might receive loans, and U.S. and foreign banks engaged in international financial transactions. A report which updates two previous reports is expected to be published in March 1978.

RURAL DEVELOPMENT

Examples of Program Results, FY '77

Growth of Rural Employment

Nearly 4 million new nonfarm wage and salary jobs were added in rural and other small communities between 1970 and 1977. Overall employment increased by 22 percent in nonmetro areas compared with 11 percent in metro areas. The greatest increases were in services (39 percent), mining (36 percent), and finance, insurance, and real estate (34 percent).

The 1974-76 recession had different impacts in metro and nonmetro areas. Unemployment rates rose dramatically during the fourth quarter of 1974, peaking at about 9.2 percent in both metro and nonmetro areas. However, throughout the period, the percentage of people working part-time for economic reasons and those who dropped out of the labor force because they were unable to find jobs remained greater in nonmetro areas. By the fourth quarter of 1976, 2.6 percent of the metro residents and 3.3 percent of the nonmetro residents were in these disadvantaged categories.

Decentralization of U.S. Population

An annual monitoring of trends in U.S. population distribution is now possible, as a result of data produced cooperatively by the Bureau of the Census and State agencies for operation of the revenue sharing program. Analysis of such data showed that the trend of revived nonmetropolitan population growth continued through July 1975. Such areas had a net in-migration of 1.84 million people from April 1970 to July 1975.

Research was begun utilizing a variety of tabulations drawn from the Continuous Work History Sample of the Social Security Administration. These data cover the migration of workers from 1965-70 and 1970-75, providing information on the geography of worker moves, their class of industry, and level of earnings compared with nonmigrants. These data are still being inspected and verified. In general, the data confirm the trends implied by population statistics of a reduction of movement into the major cities and an increase of movement out of them. The workers moving into nonmetropolitan areas tend to average about the same income from wages and salaries as the nonmigrants in the same areas. The newcomers are more likely to be in mining, construction, trade, and transportation than are the nonmigrants. The in-migrants are less likely than the longer-term residents to be involved in manufacturing or local government employment. But the economic role of the in-migrants is not radically different from that of the nonmigrants.

Trends in Farm Population

The number of people living on farms in 1976 averaged 8,253,000, or 3.9 percent of the total population. This represented a drop of about 600,000 from 1975, and was the heaviest indicated year-to-year decline in the 1970's thus far. Part of the decline (an estimated 130,000) was the result of improved procedures adopted by the Bureau of the Census (the collecting agency) in the estimation of data for nonrespondents. An absolute end to the decline in the farm population does not seem to have been reached, even though it is known that the number of younger farm families has been increasing in recent years.

Residential and Regional Distribution of Benefits under the Allowance for Basic Living Expenses Welfare Reform Proposals

In 1974, the Joint Economic Committee, U.S. Congress, developed a broad-based welfare proposal called Allowance for Basic Living Expenses (ABLE) to replace the existing Aid to Families with Dependent Children (AFDC) and Food Stamp programs. ERS analyses found that: compared to the present AFDC/Food Stamp system of income maintenance, a program such as ABLE, with universal coverage and national eligibility standards, would lead to a substantial increase (42 percent) in the number of eligible families. ABLE would not significantly shift the distribution of eligibles among regions or between urban and rural areas despite the large increases in eligible families.

There was no simulated increase in total direct cash payments under ABLE despite the increase in the number of eligible families. However, the regional and residential distribution of benefits would change substantially. The South would experience a 35-percent increase in total benefits. All other regions would experience decreases. Total benefits to rural areas would increase while total benefits going to urban areas would be reduced, except in the South.

Welfare reform is often viewed as one way to provide fiscal relief for large cities. Such fiscal relief would unlikely be with the guarantee levels utilized in this study. Large cities in the Northeast, North Central, and West would need to supplement benefits to current AFDC recipients to maintain benefit levels for families currently on the rolls. However, fiscal relief provided by a Federal welfare reform would be substantial for rural areas and the South, and the burden of supplementation on these States and localities would be small.

Income and Population Growth in Nonmetropolitan Areas

A study was undertaken during FY '77 to observe the performance of Northeastern nonmetropolitan counties regarding income, employment, and population growth between 1970 and 1974. Northeastern nonmetropolitan counties had smaller income gains than similar nonmetropolitan counties in other regions. Yet, many of these Northeastern nonmetropolitan counties had high population growth rates, an observation not supported by contemporary theories of economic growth. The study identified 18 new nonmetropolitan retirement counties, in addition to 11 such counties identified earlier. Out of the 29 Northeast nonmetropolitan

retirement counties 21 experienced low-income and high-population growth. The increasing number of retirement counties is seen as a partial explanation of the emerging contradictory relationship between area income levels and population growth.

It would appear that some people were "pulled" into certain counties in the nonmetropolitan Northeast by a set of influences as strong or stronger than the past prevalent income and employment forces. Dissatisfaction with large urban centers and concomitant crime, drugs, pollution, race conflict, school troubles, and fiscal matters appear to make living in nonmetropolitan areas more attractive. Many of the former rural-urban gaps in material conveniences such as housing, availability of water and plumbing, roads, and communication have been substantially reduced. These forces, combined with increasing employment opportunities, should lead to continued growth in nonmetropolitan areas.

Meeting the Health Needs of Older Persons

A pilot study of older persons in Powell County, Kentucky, using representative sample data collected by personal interviews with 244 women and 155 men, showed more than three-quarters of the respondents rated their present health as fair or poor. However, only one-fifth experienced impairments in their mobility, and an equal proportion of the men and women had been hospitalized one day or more during 1974. Few statistically significant associations were found between the sex and age of the respondents and their perceived health status and needs. Many of the future health needs will require the services of professional physicians. However, the data also strongly indicate that many of the future health needs can be provided by subprofessionals and lay persons who may be affiliated with a special facility organized to serve older persons in the county.

Housing Conditions in Nonmetropolitan Areas

Analysis of changes in the quantity and quality of housing in nonmetropolitan areas revealed a marked improvement in housing conditions from 1950 to 1975. The proportion of households occupying substandard units declined from 59 to 8 percent, crowded conditions declined from 19 to 6 percent, the percentage occupying centrally heated homes rose from 23 to 58 percent, and those living in single homes valued at more than \$12,000 (constant dollars) rose from 13 to 29 percent. Despite this improvement, 1.9 million households occupied substandard housing. The poor, the black, and the aged occupied a disproportionate share of this poor housing. These data are important in guiding housing programs of USDA, which currently amount to some \$2.5 billion in loans and grants annually.

Distribution of Federal Outlays

One important issue in rural development is the distribution of Federal outlays between metropolitan and nonmetropolitan areas. In 1974, the

U.S. population was predominantly metropolitan, with 72.3 percent of the people residing in these areas. In total, the Federal outlays in fiscal year 1975 favored metropolitan areas, which received 74.9 percent. Therefore, on a per capita basis, the selected Federal outlays were higher in metropolitan than in nonmetropolitan counties--totaling \$1,305 and \$1,148 respectively. Per capita outlays for defense and space were over twice as great in metropolitan areas than in the more rural counties of nonmetropolitan America. If defense and space outlays, which accounted for 30 percent of the total, are excluded, per capita outlays in metropolitan and nonmetropolitan counties would be \$860 and \$938, respectively.

Financing State and Local Government Costs Resulting from
Coal Development

Development of energy resources in the more rural Western States is likely to create severe financial problems for some State and local governments. This new economic activity, with population immigration and greater demand for public services, will generate a need for more government revenues. Increased use of mineral taxation is one way of financing the new services without increasing the tax burden on the area's existing residents.

Four mineral taxes--ad valorem, severance, gross production, and net production--have been evaluated. Taxes were compared on the basis of ease of administration, social justice, consistency with national economic goals, and revenue adequacy. The gross production and severance taxes are the most desirable, with the gross production tax preferred except when the market price of the mineral is difficult to establish.

Since mine construction or development can take several years, any tax based on the output of the mine makes no contribution to government revenues until after the need for the new services has arisen. Many local governments face this front-end financing problem. No tax analyzed, with the possible exception of the ad valorem tax, treats this problem satisfactorily.

New mines, generating plants, and gasification plants pay other taxes, though, and the population they attract affects the amount of State aids and shared taxes which localities receive. A new model, operational for Montana, North Dakota, South Dakota, and Wyoming, estimates these effects. In all States, the total revenue available appears sufficient to meet any increased demand for services. When revenues are disaggregated, however, the picture changes. State governments and counties appear to receive new revenues sufficient to meet their needs, but cities and (except in Wyoming) school districts are less well off. Cities especially appear to be facing potential problems with new revenues estimated at only \$100 to \$300 per new mine employee.

A related model helps in evaluating ways of changing State mineral taxes to meet new financial needs. This model, labeled "MINETX," estimates the impact of changes in the State and local tax system on the tax bill of a particular mine. It provides the decisionmaker with a capability for rapid evaluation of the effects of alternative tax structures on several different size model mines. The results of these studies have been used by the Western Governors Conference, the Minnesota Legislature's Cooper-Nickel Study Commission, and others.

Selected Specific Objectives for FY's '78 and '79

Impact of Development on Local Government Services

Natural resource-based development in the Northern Great Plains--mines, generating plants, and other developments--will have major impacts on local government finances. A study to be published during the fiscal year reports on impacts on local government revenues. It will be followed by a study of the impacts on local government expenditures. In particular, the thrust of the study is to identify points in population growth at which communities tend to have to offer new services or significantly expand expenditures on existing services. For example, law enforcement expenditures may be relatively constant as population increases, until the point is reached at which a new policeman or another patrol car needs to be added. Knowledge of the points at which these discontinuities occur would be very valuable for local officials trying to plan for growth.

Local Government Employment

The number of employees added to local government payrolls between 1962 and 1972 was more than the total number of federal civilian employees. Yet, local government employment has been given little study, particularly in rural areas. A project beginning in FY '78 will analyze nonmetropolitan local government employment trends and the relationships between employment and selected socioeconomic factors. It will also study issues of retirement coverage of local government employees.

Federal Outlays

The analyses of federal outlays for various programs in metropolitan and nonmetropolitan areas have proven to be a valuable tool for understanding the focus of federal programs. However, the data need considerably further study to identify their proper uses. Work begun in FY '77 will be extended to analyze issues of measuring federal program equity, the value of county-level data in such equity analyses, the effect of data quality problems on research conclusions, and the importance of federal spending in promoting economic development.

Credit Situation in Rural Areas

With the exception of credit for farm purposes, little information has been available on credit use and availability, and on credit markets in

rural areas. A study will be initiated of credit for business and housing in rural areas. Initial emphasis will center on identifying and analyzing available secondary data to gain a better understanding of current conditions, and on summarizing the current state of knowledge about rural capital and credit markets. A related study will analyze economies of size in municipal bond marketing, and innovative State programs for reducing local borrowing costs.

Rural Housing Conditions

The 1975 and 1976 Annual Housing Surveys, and other secondary housing and population reports, will be analyzed to provide up-to-date information on the status of rural housing for program administration and development, as well as other uses. Trends in the production distribution and use of mobile homes in meeting rural housing needs will be given particular emphasis. It is expected that a study of farm wage-worker housing will be completed during the fiscal year.

Commuting Patterns of Recent Migrants to Nonmetro Areas

One of the unanswered questions about recent metro to nonmetro population movement is the extent to which people making such moves continue to work in metropolitan areas. The Annual Housing Survey of 1975 combined migration and commuting questions. From this source, it is hoped that place-of-work codes can be developed on current metro-nonmetro boundaries that will permit separate identification of nonmetro commuters to metro employment and provide the ability to assess the proportion they comprise of recent migration to nonmetro areas, as well as the manner in which they differ in key personal characteristics from other immigrants.

Utilization of Health Services in Rural Areas

Research is presently underway to examine the utilization of health services in rural areas. Specifically, a methodology has been developed to estimate usage of physicians, hospitals, emergency rooms, and ambulances. The methodology consists of procedures which local decisionmakers can apply to existing data for any small geographic area. One example is the Great Plains where the method has been used to answer questions about hospital overbedding and subsidies for ambulance service. At the same time, related research is being continued which utilizes information from the above analysis, along with other research results, as input for a general model to assess the medical resources in any designated area of the country.

Impacts of Welfare Reform on Nonmetropolitan Areas

On August 6, 1977, the Carter Administration presented its Program for Better Jobs and Income to Congress. If enacted, this welfare reform proposal is expected to benefit rural areas, particularly in the South. ERS will analyze the proposal to determine the general impact on rural

residents, including estimates of the population affected and the distribution of total benefits. Emphasis will be placed on specific aspects of the proposal which differentially affect rural people.

The Impact of Alternative Measures of Employment

Employment and unemployment statistics have, in recent years, been increasingly used as a basis for guiding government economic and social policies. They also serve as a basis for allocation of public funds. Metropolitan and nonmetropolitan labor markets have different structures, job distributions, and labor force characteristics. For these reasons, statistical measures of economic hardship and employment status developed for metropolitan labor market areas often do not convey the same meaning in the less densely populated nonmetropolitan areas. This study systematically evaluates the impact of conceptual changes in development of employment and unemployment statistics on measurement of economic hardship and employment status in metropolitan and nonmetropolitan areas. Implications of these different conceptual measures for public funds distribution, and for economic policy interpretations for non-metropolitan areas will also be assessed.

Examples of Program Results, FY 1977Economics of Controlling Agricultural Nonpoint Pollution

A study was conducted to examine the effects of various strategies to control excess erosion and sedimentation from field crop production in a watershed of the Iowa River in East Central Iowa. In addition, the environmental effects of certain restrictions on insecticide use were measured in terms of an environmental exposure index. The imposition of a 10-ton acre gross erosion limit reduced the amount of sediment delivered to the Coralville Reservoir by 68 percent while increasing production costs by 2.5 percent over the baseline solution values. A 5-ton per acre limit was found to lower the sediment delivery by 83 percent while raising costs by 8 percent over the baseline. At the 3-ton per acre limit, the biggest jump in costs (17 percent) was found, accompanied by a 91 percent decrease in sediment delivery relative to the baseline solution.

The impacts of restrictions on insecticide use were found to be similar, but not nearly as drastic, as restrictions on sediment. The cost increases in production were less than 0.05 percent, even with a 90 percent reduction of the environmental exposure index compared to the baseline solution. However, these results were critically dependent upon the availability of an equally effective insecticide with a substantially lower environmental exposure index.

Evaluation of Predation Losses and Predator Control Alternatives

The sheep industry has been declining rapidly since 1960. In the West, predator losses are often identified as a major cause of this decline. The impact of predator control on the sheep industry has been under study by ERS for the past 2-3 years.

Lamb and sheep losses.--Predators, principally coyotes, were the major cause of lamb and sheep losses in the Western United States in 1974, according to surveyed farmers and ranchers. Rates of loss to coyotes varied considerably among individual farmers and ranchers. Overall, in the Western United States, losses attributed to coyotes in 1974 numbered 728,000 lambs (more than 8 percent of all lambs born) and 229,000 adult sheep (more than 2 percent of inventory). This represents a third of the total lamb deaths to all causes, and a fourth of the adult sheep deaths. These losses cost U.S. sheep producers some \$27 million in lost returns in 1974, while consumers lost some \$10 million in benefits because of higher prices for lamb and reduced quantities available.

Discontinued production.--Former sheep producers in Colorado, Texas, Utah, and Wyoming were surveyed to determine why they had discontinued sheep production. Factors which they rated of greatest importance in their decisions were high predation losses, low lamb and wool prices, shortage of good hired labor, and their own age.

Control efforts.--The relationship of control efforts to predator population levels and sheep losses was found complex and difficult to measure. In general, current Federal control efforts appear to reduce sheep losses to some degree, although the effects are very transient.

Alternative policies.--Alternative policies include changes in the overall level of expenditures on control and changes in the mix of control methods. The impacts of the alternatives were developed through use of a computerized policy and information system.

Expenditures for controls.--Under the current mix of methods, the effect of increasing expenditures from the 1974 level of \$7 million to \$20 million would be a gradual decrease in lamb losses (from 8.5 percent to 4 percent), a decrease in coyote numbers, and a slight increase in social and net economic benefits. Beyond the \$20-million level of expenditures, net economic benefits decline slightly, and socio-environmental benefits decline rapidly. At expenditures below 1974 levels, both economic and socio-environmental benefits decline substantially.

Economics of Solid Waste and Sludge Management in Rural Areas

The management of municipal effluents, sludges, solid wastes, and agricultural processing wastes presents economic and environmental challenges to landowners and communities.

Legal implications of applying wastewater to land.--Surface-water law and ground-water law were examined in representative riparian and water appropriation States to determine the potential impact of these laws on the development to treat wastewater by application to land. For the most part, State water rights laws were found to contain enough flexibility, through emphasis on encouraging "reasonable" uses of water, to enable land application systems to operate freely from legal uncertainty.

Economic analyses of applying municipal sewage to land.--A computerized model was developed to analyze costs of applying municipal sewage effluent to land. Most advantages associated with increasing facility size were realized after the facility reached a capacity of 10 million gallons per day (mgd). As facility size increased from 0.05 to 10 mgd, average total cost per unit of volume fell by over 50 percent, while from 10 to 100 mgd they fell by less than 15 percent. The cost was analyzed using cost estimates and cross elasticities. Of the variables analyzed, the sewer construction cost index, capital subsidies, design flow, storage, application rate, and crop selection variables were found to have the largest impact on cost variation.

Equity implication of wastewater treatment regulations.--The costs of wastewater treatment were analyzed to identify the equity implications of the current wastewater treatment law (P.L. 92-500). It was found that requiring rural communities to achieve high levels of wastewater treatment results in significant cost burdens on rural communities due

to higher per unit treatment costs. Average per unit treatment cost for 0.5 mgd treatment facilities are 2-1/2 to 3 times higher than the cost for a similar 10 mgd plant. Existing capital subsidies for treatment plant construction do not offset the inequities to rural communities. An examination of Environmental Protection Agency (EPA) grant awards under P.L. 92-500 revealed that larger facilities have received a greater proportion of the grant money than their proportion of total population would indicate. While economies of size enter the analysis, the impact on rural communities of the grant allocations is magnified. The equity impact of P.L. 92-500 on rural communities can be reduced through modifications in treatment requirements or transfers of funds to rural areas.

Economics of composting sewage sludge.--Research on the recycling and reuse of municipal sludges in agriculture focused on cooperative efforts with ARS scientists located at Beltsville, Md. A detailed cost analysis of the aerated pile process for composting sewage sludge developed at the Beltsville station was completed. The cost of composting sludge was estimated to range from \$35 to \$50 per dry ton. This compares with costs of \$10 to \$35 per dry ton for ocean dumping, and costs of \$57 to \$93 per dry ton for incineration. Composting may be a cost effective alternative to resolve sludge management problems for some communities. One of the major problems is the use of the compost. Preliminary studies of compost use found considerable demand on the part of turf farmers and nurserymen for the compost in their business. An evaluation of its use in gravel pit revegetation was initiated.

Economic Impact of Pollution Controls on the Dairy Processing Industry

Dairy processing plants in Minnesota were studied to determine the impact of the water quality regulations on their operations. Wastewater effluent limitations for the dairy processing industry can be met by discharging directly into municipal treatment systems or by onsite treatment. Case studies of four Minnesota dairy plants with private treatment systems found that only a final land disposal system could meet the most restrictive water quality standards for all months of the year. A well-designed stabilization pond could at best be expected to meet a lower quality effluent guideline. Sewer charges for most dairy plants that discharge into a municipal waste treatment system have, or will be expected to increase as municipalities remodel or construct new wastewater treatment facilities to meet high pollution control standards. The study found that, in general, dairy plants that use municipal wastewater treatment facilities are better off economically by remaining with the municipality and paying higher user charges than to construct their own private treatment system. Results show that for typical Minnesota dairy processing plants, production costs would be expected to increase about 2 percent for most manufacturers of dairy products. At the retail level, prices would be expected to rise about 0.3-0.7 percent to cover increased pollution control costs.

The capability of the Department of Agriculture to conduct assessments of pesticide cancellations has been enhanced with the formation of the National Agricultural Pesticide Impact Assessment Program and the receipt of supplemental funding by participating agencies to carry out this program. As ERS's contribution to the Department program, a number of economic assessments of pesticide cancellations were initiated. Pesticides being assessed include toxaphene, lindane, BHC, and pronamide. These studies are not yet completed. It is anticipated that other studies will be initiated in the near future. Two major assessments were completed.

Economic impacts of withdrawal of chlordimeform for tobacco budworm control.--An assessment of the need for emergency exemption from registration of new insecticides, not yet registered, to control the tobacco budworm in cotton was completed. This need was promoted by the voluntary withdrawal of the insecticide chlordimeform from the market by the manufacturer. The study was conducted in cooperation with other agencies in the Department, and State experiment station and extension personnel.

It was estimated that up to 3.9 million acres of cotton could require emergency treatment for tobacco budworm in 1977. If anticipated infestation levels occurred and were not controlled, severe losses ranging from \$17 to \$29 million on infested acres could result because of the voluntary withdrawal of chlordimeform. In addition to direct losses to growers, secondary impacts of at least as great a magnitude as direct losses would be expected. Use of the new insecticides would offset this loss, increasing gross returns \$23 to \$39 million over what would be expected if only currently registered insecticides were used. Without the new insecticides, negative returns to land and management could range from -\$6 to -\$53 per acre for heavily infested acres in the Southern Plains, Delta and Southeast. With heavy, uncontrolled infestations, domestic cotton prices would escalate and export potential would decline significantly.

Economic consequences of suspending the herbicide trifluralin.--Another assessment dealt with the impact of a possible suspension of the herbicide trifluralin. The study was conducted in cooperation with the State experiment stations and extension services, and with EPA. The report concluded that if trifluralin were suspended, the income of agricultural producers would likely decline \$521 million in the short run as a result of increased production costs and reduced yields. The estimated loss in income for users of trifluralin was \$339 million, \$77 million for cotton, \$198 million for soybeans, \$26 million for peanuts, sugar beets, and sunflowers; and \$38 million for fruits and vegetables. Additional costs for weed control were estimated to be \$6 million for cotton, \$36 million for soybeans, \$19 million for peanuts, sugar beets, and sunflowers, and \$27 million for fruits and vegetables. It was estimated that nonusers of trifluralin (corn producers) would experience losses of \$182 million as a result of changes in prices

received. Cotton and soybean prices would increase, but some farmers would shift to corn production resulting in an estimated 25-cent-per-bushel drop in corn prices. This price decrease would not be offset by increased prices of cotton and soybeans.

Following the completion of the study, EPA decided not to immediately suspend the use of trifluralin. The issue continues to be reviewed and further investigation may be necessary.

Livestock Waste Management

During FY '77, ERS developed information and a data base on the volume of animal manure produced in total and by county. The data is in terms of production from confinement and nonconfinement operations, by species, and N-P-K equivalents available as fertilizer.

The study contributes to cooperative work with ARS, the States, and EPA to identify areas with the greatest animal waste pollution problems. ERS plans to publish results of the study in a statistical bulletin.

Land Information Systems

Throughout the United States, only a few local governments have developed land information systems capable of simultaneously serving real property taxation, land transfer, and land-use planning functions. All of these applications have occurred only in metropolitan areas. This year, ERS completed the design of a simplified computer-assisted land information system suitable for use by a rural county government. The system is based on a geographic identifier and three computerized land information files on ownership, transfers, and physical features of land. To test the technical and economic feasibility of the system, an operational model was built and compared to the functions of the conventional governmental offices responsible for maintaining land records. The computer system was found to be technically feasible in the sense that reports generated met statutory standards and economically feasible in the sense that record keeping costs of the local government could be substantially reduced.

Preservation of Farmland

An analysis of secondary data of New York State's experience with agricultural districts to preserve farm land was completed.

This is part of a multiyear plan to determine the impact of the State's agricultural district program in preserving an agricultural base. A total of 277 agricultural districts have now been formed in New York, covering 3.9 million acres (12.5 percent of the State's total land area). The districts include over 11,000 farms with annual sales of \$10,000 or more. Districts have been formed in nearly all areas of the State--45 of the 57 county legislatures have created districts--including 16 counties within standard metropolitan statistical areas. Less than 30 percent of all districts are located within 25 miles of a

large, central city, however. The bulk of the districted acreage is far removed from larger central cities, and is not currently under intense urban development pressures. Proponents of the districts argue that the act of forming districts has the important effect of bolstering confidence (among farmers and nonfarmers alike) in the future of farming. An important issue, however, is whether such psychological factors can be sustained over time.

Changes in Land Use

Preliminary estimates of changes in major land use from 1969 to 1974 indicated that cropland (excluding cropland pasture) remained at about 383 million acres, halting the downward trend that began about 1950. Cropland harvested increased to 326 million acres in 1974, after declining from 352 million acres in 1949 to 286 million acres in 1969.

Grassland pasture and range decreased 11 million acres to 681 million acres in 1974, continuing the long-term trend. Grazed forest land decreased 18 million acres during the 5-year period to 180 million acres, although total forest and woodland remained at 718 million acres, the same as in 1900.

Approximately 1.1 million acres of rural land shift to special uses annually. These uses include urban and transportation needs, parks, wildlife areas, national defense, and water reservoirs. About one-third of this total, or 370,000 acres per year, is from the cropland base.

Data from the SCS potential cropland study were utilized to evaluate land use changes by land quality and use. In particular, the loss of prime agricultural land to such irreversible land uses as urban and water was analyzed. The study indicated 1.5 million acres of class I-III land were converted to irreversible land uses each year between 1967 and 1975. During the same time period, 4.2 million acres of prime land were converted to cropland from noncropland purposes each year. Therefore, if all of the class I-III land lost to urban and water uses was cropland, a net gain of 2.7 million acres of prime land a year were added to cropland between 1967 and 1975.

Irrigated Agriculture and Energy Consumption

Irrigated agriculture accounts for a fourth of the Nation's total agricultural output. This segment of the industry fears decreased output because of emerging water and energy shortages. Surface water supplies are shrinking due to adverse weather, and economic supplies of ground water are decreasing due to high rates of ground-water pumping, plus sharply increased energy costs for pumping irrigation water. In the Western States, three-fourths of the cropland is not irrigated, and hence, directly subject to the vagaries of weather. Of the one-fourth of the crop acres irrigated, about half is supplied by ground water and half by surface water. Practically all of the vegetables and most of the fruit crops depend on irrigation. The outlook varies, depending on

whether the water supply is from surface or pumped ground water. Most irrigation in the Central Plains is pumped ground water, where the water table is declining and the cost of pumping is increasing. Although it is considered desirable to set an "optimum" rate of ground-water depletion by all States, an inventory of State legislation shows little effective control of depletion in the Central Plains. This study did indicate that methods used in parts of New Mexico, Colorado, and Wyoming were effective in controlling depletion, and points out some of the problems involved in achieving regionwide controls in the future.

Although only 6 percent of U.S. crop acres are irrigated by pumped ground water, the study shows that irrigation accounts for 13 percent of all of the energy used in agricultural production. Natural gas accounts for 30 percent of the acreage irrigated, and ranges as high as 75 percent in some States. The price for natural gas may be expected to further increase in the future. Electricity has increased in price by only 30 percent since 1972. In contrast, the price of LPG has more than doubled, and the price of natural gass has increased three or four times. Research continues to develop the information needed to determine the prospective output of irrigated agriculture given alternative energy cost and water supply levels.

River Basin Planning Assistance

ERS assistance in support of river basin planning is funded through a transfer of funds from the Soil Conservation Service, and is carried out jointly with SCS and the Forest Service (FS) under a memorandum of agreement based on Section 6 of Public Law 83-566. Some 53 cooperative river basin (CRBS, formerly called Type IV studies) and related studies are now in various stages. Seven were completed in 1976, and 12 are scheduled to be completed in FY '77. ERS also participates with SCS, FS, and other Federal and State agencies in several level B river basin studies sponsored by the Water Resources Council (WRC). ERS participation in CRBS and WRC level B planning programs emphasizes the evaluation of the economic consequences of alternative plans for water and related land resource development.

Over the years, ERS participation has become less descriptive and more analytical as more sophisticated methods of analysis have been developed. Models to identify impacts of resource development, including environmental impacts, have become fairly routine. Projections of exports, and estimates of domestic consumption, input prices, production practices, and costs are all used in the development of alternative plans for use and management of land and water in the various river basins.

Resource Conservation and Development, and Small Watershed Studies

USDA provides financial and technical assistance to communities for resource development and small watershed projects that aid local economies. ERS cooperates with the SCS, the sponsoring agency, in estimating the economic effects of selected projects, and analyzes the economic procedures and analyses used by SCS.

Selected Specific Objectives for FY's '78 and '79

Economics of Pesticide Regulation

The economic implications of the potential loss of selected pesticides for agricultural purposes will be evaluated. These evaluations will be conducted in cooperation with other USDA agencies, the States, and EPA within the framework of the National Agricultural Pesticide Impact Assessment Program. Impacts assessed will include effects of pesticide loss on farm income, costs of production, consumer prices, foreign exchange earnings, location of production, and farming practices. Approximately 20 studies will be initiated this year, and about 15 studies will be completed. Pesticide assessments to be completed include diallate, toxaphene, pronamide, DBCP, chlorobenzilate, lindane, EBC fungicides, and BHC. Other assessments will depend upon future initiation of regulatory actions.

Economics of Pest Management Technology

A study on the economic consequences of a pilot test program on augmentation and conservation of natural enemies of the tobacco budworm and tobacco hornworm will be initiated. This will be a 3-year project conducted in cooperation with the Agricultural Research Service. The first year will focus on experimental design and collection of biological information required for economic analysis.

Assessment of the economic aspects of a trial boll weevil eradication will be initiated. This will be a 3-year project. During the first year, ERS will cooperate with State experiment economists in developing an analytical framework and experimental designs. Also, baseline data on pest management practices and pesticide use will be collected and analyzed. The analysis of the data will be completed in FY '78.

Economics of Agricultural Nonpoint Pollution Control

This multiyear research project has the overall objective of assessing (on national, regional, and local levels) the economic, institutional, and environmental effects on agriculture and rural areas of alternative controls and practices for reducing nonpoint pollution from agricultural sources.

During FY '78, planned accomplishments include: (1) further quantification of the relationships between changes in water quality and the causal factors; (2) identification and cost effectiveness evaluation of management practices with potential for decreasing nonpoint pollution; and (3) completion of a user manual for planners to aid in assessing potential pollution from animal wastes applied to land, and for evaluating acceptable management practices for reducing any such pollution.

Environmental Benefit/Cost Evaluation

This multiyear research is aimed at developing and applying procedures for broad scale evaluation of the benefits and costs of pollution abatement and other environmental enhancement policies and programs.

During FY '78 planned accomplishments include: (1) further development of procedures and guidelines for environmental benefit/cost evaluation; and (2) application of these procedures and guidelines to a cooperative river basin planning effort in Oregon, with particular attention directed toward obtaining public input regarding the economic, recreational, and aesthetic benefits of improvements in water quality.

Impacts of Coal and Oil Shale Development on Environmental Quality in Rural Areas

This research is being done with funding from EPA. This 5-year project, now in its third year, has the objective of assessing the economic and environmental quality implications for rural areas from development of coal and oil shale deposits.

During FY '78, planned accomplishments include: (1) regional impact reports on coal development in the Interior, Eastern, and Gulf States, and on oil shale development in Western States; and (2) first applications of a new interregional analytical system to assess impacts of alternative coal development policies in the Western and Interior regions.

Water and Energy Use for Pump Irrigation in the Great Plains

This study is in response to increasing national and regional concerns about energy requirements for irrigation. Updated estimates of energy used for pumping irrigation water for all Great Plains States will be made. Irrigation budgets for alternative water supply conditions, distribution methods, energy types, and irrigation management systems in the Great Plains will be developed. Models and procedures for economic analysis of effects on irrigated agriculture, of energy availability and pricing, and of management systems to conserve energy and water will also be developed. An analysis will be made of the physical, institutional, and economic causes for trends in irrigation development in the Great Plains.

Resource Economic Survey

A major data gathering activity is planned to fill the current void in basic information about ownership and land use. A mail survey of 60,000 landowners and up to 11 follow-on mail or telephone surveys to obtain information on ownership patterns, characteristics of landowners, and constraints on agricultural resource use, conservation, and development will be conducted.

Surveys, data processing, and tabulations mostly will be completed in FY '78. Analyses of the relationships between investments (disinvestments) in resources and such factors as ownership, owner characteristics, resource quality, and economic factors will be made in FY '79.

Agricultural Land Preservation

A pilot survey of landowners in Erie County, N.Y., will be completed by mid-FY '78. This survey will be addressed at samples of landowners who are, and who are not, participating in the agricultural districts program in New York State. A comparative analysis of landowner motivations and experiences with the districts will be made. If landowner experiences in Erie County are favorable, plans will be developed for a large-scale field evaluation throughout the State on the impact of the agricultural district program in preserving an agricultural base.

OBERS Projections

A new set of OBERS projections will be produced. OBERS is a nationally consistent set of economic activity projections that are utilized in water resource project planning by member agencies of the Water Resources Council. ERS is responsible for the agricultural projections contained in this series.

River Basin Planning Assistance

Several cooperative river basin studies are scheduled for completion in this fiscal year. A study in Southwestern Ohio is expected to provide estimates of future changes in farm output associated with improved methods of erosion control. Study results will also include changes in environmental quality as measured by reduction in soil losses and improvements in water quality. In Southern Iowa, a linear programming model will be used to estimate relationships between erosion control and maintenance of soil productivity. The model will measure tradeoffs between additions to productivity through use of fertilizers and reductions in productivity from continued erosion losses.

River basin studies are providing important input to section 208 plans. One example is in Missouri where data on erosion from previous river basin studies is being expanded for use in analyzing alternative land use plans designed to improve water quality. States enacting or considering erosion control legislation can use the results of river basin study analyses to determine the impact of such legislation on farm incomes and costs.

CONSUMER ISSUES AND FOOD PROGRAMS

Examples of Program Results, FY '77

Introduction of a Consumer Periodical

With the March 1977 issue, the National Food Situation was reoriented to cover a broader range of food-related issues of interest to consumer affairs professionals. The new periodical is issued quarterly, and provides an analysis of the food supply, price, and consumption situation and outlook. It also reports developments in marketing, consumer research, consumer legislation, and USDA actions of interest to those concerned with consumer problems. Initial reactions were favorable.

Open-dating of Food

A wide variety of perishable and semiperishable food products are open dated by a variety of presentation types and methods to indicate freshness. A study was undertaken to determine consumer reactions to open dating and identify any problems.

Results indicate almost all consumers consider the open-dating concept to be a useful shopping aid. Failure to comprehend the difference between the several presentation types and methods used, however, suggests a need for standardization. Further, many consumers regard open dates as throw-out dates, and waste a substantial volume of food. Consumers also prefer a throw-out type of date over the freshness type open date commonly used today.

Unit Pricing

Widespread adoption of unit pricing by retailers was initially met with numerous complaints by consumers. A study was undertaken to determine whether these complaints still persisted after passage of time. Results indicate that retailers have apparently made a number of improvements, and consumer complaints with the system are few and relatively minor.

Consumer Perceptions about Health and Food

A study was undertaken to determine whether increased knowledge and publicity about the relationship between health and diet might be affecting consumer food preferences. Results suggest that a large percentage of consumers are aware of this relationship, and are making a conscious effort to change diets and food purchases for cosmetic, treatment, or preventive reasons. Most are attempting to reduce consumption of animal fats and highly sweetened foods by purchasing low-fat dairy products, lean beef, fresh fruits and vegetables, and artificially sweetened foods. Future shifts along these lines suggest considerable impact upon the types of foods and raw products produced, processing techniques, and use of additives.

Identification of Food Purchase Patterns of Food Stamp Recipients

A pilot study of food stamp recipients is nearing completion. It will show the differences in the types of food purchased by persons using food stamps and those not using food stamps in the same stores. This is a case study of eight stores. These data will indicate the types of foods which were supported by expenditures of food stamps in 1976. Comparisons can be made of the relative amounts of different types of foods eaten by the two categories of purchasers. Also, when total food purchased is treated as a market basket, the proportion of total expenditures for protein can be compared with the protein allotment incorporated in the Department's Thrifty Food Plan.

Analysis of Factors Affecting Participation in the School Lunch Program

A study was completed of the factors affecting participation in the school lunch program including price, open lunch policy, menu selection, and satellite lunch operation. Price was found to be the dominant factor influencing participation in elementary and high schools. In elementary schools, the second most important factor was whether the school was a satellite operation of a larger lunch program. The open lunch period policy was the second most important factor for high schools. Availability of different menu selections was of less importance in both types of schools.

Selected Specific Objectives for FY's '78 and '79

Food Safety Regulations

Regulatory changes are currently being considered in the area of food safety, with particular emphasis on food and feed additives. Before final policy action is taken, the economic impact on producers and consumers will be determined. Where appropriate associated costs and benefits will be computed.

Analysis will be done on selected individual additives or groups of additives deemed appropriate for analysis, and for which the necessary data are available.

This work will complement the work to be done by the Department-wide task force currently being established to assess the technical and economic impacts of proposed FDA action. Reports on the part of the work dealing with antibiotics will be available by January 1979.

Food Stamp Households Store Patronage Patterns, and Comparative Market Basket Costs

This research aims to identify where food stamp households shop for food in terms of: (a) locations of retail food establishments (metropolitan areas compared to rural communities); (b) types of food establishments (independent and chain stores, dairy route service, etc); (c) sizes of

food establishments; and (d) the competitive contexts within which food establishments function (number and variety of food establishments in the same zip code area). It also will compare the costs of identical market baskets of food items purchased in different geographic locations and types and sizes of food stores. Data collection will be completed in 1979.

Evaluation of Tradeoffs Among Food and Nutrition Programs and other Income Support Programs

Households participating in USDA food programs also receive benefits from other Federal income support programs. For example, 43 percent of food stamp households also received AFDC benefits in September 1976. In the same month, over 20 percent also participated in the SSI program. The relationship among food and nutrition programs and other income support programs will be examined.

Federal Commodity Support: Its Impact on Specified Food Programs

This research aims to identify major food program impacts associated with Federal commodity support efforts. Success of commodity programs in supporting farm income can materially increase the cost of subsidizing the purchasing power of food stamp households, and of supporting the school lunch program, particularly for free and reduced-price lunches.

Free commodity distribution to schools, moreover, may create menu and storage related problems at the local level which will be reflected in the costs of operation. Preliminary results will become available by August 1979.

Food Use in Schools

Two publications are planned for FY '78 on the market for food in the Nation's schools and the Puerto Rico school system. These reports will use data obtained in a survey conducted in cooperation with the Food and Nutrition Service (FNS). The analyses will provide measures of change and trends in the quantities and values of foods used; the extent and use of convenience foods, and new food forms; changes in sources of food supply, procurement practices, and methods of ordering; levels of pupil participation; use of USDA-donated commodities; and information on food processing contracts. Information on food procurement practices and availability of refrigerated storage facilities also will be evaluated, as will potential savings and efficiencies inherent in volume food purchases. Publications are planned for April and September 1978.

Consumers' Food-related Behavior, Attitudes, and Motives

Understanding consumer attitudes about food and resulting behavior in the market is essential to an understanding of the demand for food and related services, food policy objectives, and the economic welfare of the food delivery system. In FY '78, the third phase of a national household survey will include studies on: (1) direct-marketing-consumers' experience with such channels; (2) beef preferences, and perceived impact of changes in grade standards; and (3) home food production.

Direct marketing data will include consumers' familiarity and satisfaction with such outlets, and the proportion of selected commodities purchased through this channel. The beef section will measure consumers' attitudes concerning specific attributes of beef--such as external fat and marbling--and relate these attributes to perceived changes in quality of various types of beef as a result of the revised Federal beef-grade standards instituted in February 1976. In addition to information on the motives and incidence of home food production, data from this survey will be used to help improve statistics on the national food supply which will then be converted to nutritional equivalents. Preliminary reports are planned for June 1978, with more detailed publications to follow.

Other studies to be completed in FY '78 include: health concerns on diets, and food demand; usefulness of food shopping information; consumer food-shopping behavior, consumer attitudes about fabricated foods; and household energy adjustments.

SECTION II

Projects to be implemented as additional resources become available.

ENERGY USE, CONSERVATION, AND DEVELOPMENT IN
AGRICULTURE AND RURAL AMERICA

Objectives

This proposal delineates economic research to provide more in-depth analysis of energy availability, price, and development in relation to agricultural production, processing, and distribution, and to rural America. These resources will provide a technical staff to maintain a minimum level of basic economic analysis for information to address agricultural and rural area policy issues related to energy. The objectives of this proposal are:

1. Develop and maintain data on the use of energy by type in the production, processing, marketing, and distribution of farm products; and in businesses, households, and transportation in nonmetropolitan areas,
2. Determine the impact of energy shortages, alternative price structures, regulations, and taxation policy on the cost of food; on the regional location of production and processing of food and fiber; on the structure of the farm production and processing sectors; and on nonmetropolitan business activity, and commuting and living costs (particularly shelter costs) of rural households, and
3. Evaluate the economic and environmental implications of energy conserving and new energy source technologies in terms of investment costs, rates of return on investment, and incentives to enhance the rates of adoption of these technologies in agriculture and rural America.

Need for Achieving Objectives

Energy shortages, rising energy prices, and changes in energy policies and regulations are likely to alter many of the basic cost and production relationships in agriculture and in transportation and cost of living relationships in rural America. The relationships affected are far too complicated for casual investigation to yield sufficient detail for comprehensive analysis. Full consideration of the energy component of the food system requires a rigorous research effort on a continuing basis. Existing capability to measure impacts is limited, and attempts to develop adequate descriptive information and policy analysis tools have been thwarted by a lack of staff and financial resources.

Previous ERS research on energy use in agriculture and rural America has provided a data base for the farm production sector, conservation guidebooks for certain production practices, a report on energy use in

poultry production and processing, and studies of oil shale and coal developments. These efforts fall short of providing an adequate base for assessing the full range of energy problems and issues facing agriculture and rural America.

Unlike other industries, agricultural production, processing, and some marketing is constrained by biological relationships, making the absolute level of energy requirements highly unpredictable from one year to the next. Because of these biological imperatives, energy regulations and policies which do not recognize the unique characteristics of agriculture could drastically alter the capability of the food and fiber system to deliver food and fiber for domestic and export demands.

It is vitally important, however, to go beyond agriculture in studying energy use in rural areas. According to the Bureau of Economic Analysis, some 87 percent of total nonmetropolitan employment in 1974 was in the nonfarm sectors, with agriculture and farm services making up the rest. While energy use in some of these rural nonfarm industries may be studied in connection with studies of overall industrial use, none are likely to focus on rural areas separately. Consequently, they will not provide the necessary data to permit analyses of issues such as the likely impact of higher energy costs on economic development in rural areas and the potential impact of higher commuting costs on settlement patterns in these areas. Further, with the large commitment in USDA action programs to promote improved rural housing, it is vital that we have improved information on the energy component in shelter costs.

Proposed Plan for Achieving Objectives

This plan builds on previous and current research to provide the capability for comprehensive and systematic analyses. It also anticipates a broadening of research efforts in the areas of technology assessment and community impacts. It is designed to provide short and intermediate term analysis at each stage of development.

Objective 1: Energy use in Agricultural Production, Marketing, and Rural America

- a. Maintain the established data base for agricultural production.
- b. Develop a flow chart of energy needs in the food system from product assembly through retailing for major types of food industries.
- c. Determine minimum fuel needs for processing and other marketing firms, including substitution potential among fuels, storage capacity, and source of supply.
- d. Determine energy use in business, industry, transportation, and households in rural areas.

- e. Assemble data on supplies of energy to rural areas, including extent of market served by type of firm, type of fuel, pricing policies, and distribution patterns.

Maintenance of energy data for the production sector, and development of data for the marketing sector would build on various sources of data available in 1978 and 1979. The development of a data base on energy use by type of fuel for the industrial sector can be completed with secondary data which would permit identification of the broad sectors of rural industry with large energy use per unit of employment and output. These data would be disaggregated by metro and nonmetro areas, with more precise industry delineations. The rural residential energy use data would be developed largely from the HUD-Census Annual Housing Surveys of 1973, 1974, and 1975. These data would be stratified by types and amounts of fuel used in rural households, and categorized by regions, by income, and by other household characteristics. Determination of minimum fuel needs for processing and food distribution, and the development of information about the energy marketing system serving rural areas would be initiated.

Objective 2: Impacts of Shortages, Price Changes, Regulation, and Taxation

- a. Analyze food and fiber industry employment and output impacts of alternative energy priority and pricing policies.
- b. Determine impacts on interregional competition in commodity production and processing of State and national fuel priorities, pricing, and tax policies.
- c. Determine the economic implications for irrigated crop production of various energy price and supply conditions.
- d. Determine the impacts of fuel pricing and taxation policies on rural households, with special emphasis on problems of the rural poor.
- e. Evaluate impacts of changing energy availabilities and prices on the economic viability of rural businesses and communities.

The data base developed for objective 1 would provide the basis to construct a system of models to analyze the impacts of energy availabilities and prices on major sectors and areas. An input-output model would be developed which would measure income, employment, and output impacts of changing fuel prices and alternative energy allocation policies for various economic sectors and areas. Similar techniques would be developed to address issues concerning interregional competition, including specific impacts on systems of agricultural production such as irrigated crop farming. Also the effects of alternative energy supply, price, and tax

policies on rural consumer expenditures and rural development would be analyzed with special attention given to the ability of households to finance satisfactory housing. A large amount of qualitative judgement must be used in these analyses, but the system of techniques developed would ensure internal consistency in tracing through the impacts of energy availability, pricing, and tax policies.

Objective 3: Economics of Energy Technologies

- a. Evaluate the economic feasibility of processes for converting organic wastes, farm crops, and biomass into energy sources.
- b. Determine the economic feasibility and necessary incentives for wider use of solar radiation as an energy source in agricultural production, rural businesses, and housing.
- c. Determine the potential for energy and shelter cost savings through adoption of improved conservation measures and innovative energy systems in rural housing.
- d. Analyze the aggregate and regional economic, institutional, and environmental implications of the adoption of selected technologies and new energy sources on the food and fiber system and rural America.

Research is currently underway to assess the economic feasibility of the substitution of composted sludge for commercial fertilizer, the anaerobic digestion to produce energy and other products from animal manures, and the use of solar energy in heating livestock shelters. Research would be expanded on the economic feasibility of bioconversion of agricultural commodities and wastes, investments needed for various methods of converting these resources, and potential use of solar energy for home heating, pumping irrigation water, and crop drying. These analyses would draw on engineering data from the Agricultural Research Service, and the Department of Energy. This area of work would be extended to include studies of the impacts of various energy saving techniques on household energy costs, and costs of producing and processing agricultural commodities. Starting in 1980, the results of these studies would be the basis for analyzing national and regional economic, institutional, and environmental implications of the adoption of selected technologies and new energy forms.

Objectives

To obtain, develop when necessary, and apply techniques for estimating the effects of weather on agricultural production and related economic phenomena such as changes in consumer prices, availabilities of food and fiber products, uses and needs of land and water resources, and levels of employment and incomes. This work focuses on the United States and other major agricultural producing regions of the world.

Need for Achieving Objectives

ERS's responsibilities include anticipating agricultural production, trade, and demands; availabilities and uses of land and water; and economic impacts associated with changes in these variables.

Weather, price relationships, input costs and availability, and technology are important factors determining the level of crop yields. Weather has a major impact and, therefore, must be explicitly taken into account in the work of the agency. Although considerable attention has been and is currently focused on the assessment of weather impacts on agriculture, it is imperative that additional, concerted efforts be made. The best available quantitative analyses for assessing weather implications need to be adapted and linked with economic analyses in order to assure that continuing, indepth, economic assessments of agricultural output, prices, and resource use reflect effective consideration of weather.

Interagency Collaboration and Coordination. The proposed work of ERS will require substantial inputs of other agencies and the expertise associated with them--particularly the data, models and expertise of other agencies of the U.S. Department of Agriculture and NOAA. Historic and current weather and climate data must be gathered, processed, compiled, and made readily available. More forecasts of weather are needed. The biological and physical relationships between weather, climate, and productivity of crops and livestock need to be better understood. All of these activities require disciplines generally not available among professionals of ERS. At the same time, the effective work of these disciplines requires interaction with economists in order to translate the impacts into product prices, food prices, incomes, and resource development programs.

In short, an interdisciplinary approach is needed in which ERS must (1) look to others for basic weather input data, (2) depend heavily on others for an understanding of relationships of weather to production, and (3) work closely with others, including USDA agencies, universities, and the private sector, in defining needed data and physical relationships, and in assessing the full expected economic impacts of weather variations.

Proposed Plan for Achieving Objectives

1. Weather crop yield models

ERS would concentrate on identifying, developing (if necessary), and applying models which quantify the relationships between weather, economic factors, physical resources, and crop yields in the United States, U.S.S.R., and other important foreign areas. Domestic, national, and regional models would be developed for cereal crops, forage, and cotton. Outside the United States, the initial effort would include identification, familiarization, and where possible, evaluation and limited testing of existing crop yield models. Priority would be given to the U.S.S.R., Canada, Australia, and India.

As progress was made with the cereal crops and major production areas of the world, coverage would be extended to smaller countries, geographic regions within the United States, and other countries and the noncereal crops.

2. Weather, water, and land use models

Encompassed in ERS activities would be work focused on the relationship between weather and the availabilities of water for irrigation in the United States as well as in foreign countries. As progress is made, attention would increasingly be devoted to questions such as the effects of weather on regional water and land use in the United States, interregional changes in production, and energy requirements and costs.

3. Improved outlook and situation analyses

As basic quantitative relationships are identified, results would be incorporated into our ongoing analyses of the agricultural sector. This should greatly improve ERS's capability to relate weather and other factors to food and fiber supplies and prices. In this way, the proposed work would support the agency's situation and outlook activities, and the needs of the World Food and Agriculture Outlook and Situation Board.

4. Impacts of climatic changes and long-range changes in weather

The joint USDA-NOAA-DOD research project on the impact of future world climatic change and variability would be examined and evaluated. Qualitative judgements of expected changes in climate would be examined. In addition, long range weather probability--crop response models would be identified, developed (if necessary), and applied to determine implications for policies and programs related to issues such as water and land development and commodity reserves.

Objectives

The broad objectives are to improve the accuracy and timeliness of ERS forecasts of retail food demand and prices, and analyses of the effects of alternative agricultural and food policies on food prices and consumption, and on farm prices and income. This will be achieved by improving the analytical capability for food demand and prices based on greatly improved data on consumer food purchases.

Need for Achieving Objectives

The Economic Research Service has the major responsibility in the U.S. Government for analyzing and forecasting supply, demand, and prices for food products; for understanding and measuring the demand for these products; and for analyzing the impacts of a wide variety of policy changes. The increasingly volatile environment since 1972 has placed considerable pressure on the knowledge base.

In recent years, there has been considerable volatility in retail prices and quantities demanded for virtually all food products. Such conditions are in sharp contrast with the long-term stability in the food sector in previous decades. Furthermore, for many years, commodity surplus conditions prevailed. This meant that the focal point of attention could be on economic analyses underlying the planning of farm production, since the behavior of the rest of the system encompassing physical distribution, processing, and final product marketing was relatively less important. However, recent experience in the food sector has reflected a far different set of circumstances compared with past trends, leading to erratic behavior of both retail prices and quantities of food products purchased for final consumption as demand was running ahead of farm production. This recent experience aptly demonstrates the needs for a continuing data base and strengthened analyses of food demand.

To better understand and forecast household consumption behavior, ERS needs more complete and more timely data from households over time to supplement aggregate data available from the National Income Accounts, ERS per capita consumption data, and other existing sources. The aggregates mask many changes by the groups which make up the total. Knowing how different groups within the population behave and the changing relative importance of those groups makes it possible to provide better forecasts. ERS also must analyze the distributional effects of economic developments and policy changes. These can only be analyzed with disaggregated models which do not assume average effects for all members of the population.

Many forces affect consumer's needs and demand for food and associated services. Most aggregate demand models include changes in total population and disposable income as independent variables. But even for these variables, we need a better understanding of the effects of the changing distribution of the population and income between age groups, household size, and sex. We also need measurements of demand shifters arising from changes in lifestyles, consumer attitudes, and technology, and new information concerning nutrition, health, and food safety.

ERS forecasts and policy analyses play a major role in decisions made by all levels of government and managers of private firms in serving the desires of individual households. Those responsible for allocating scarce public sector resources to food, nutrition, and other income assistance programs need timely information for deciding which activities to support and at what level. Policy research provides information on program impacts and interaction, and provides a basis for evaluating prospective programs. This policy research must be continuous, because no set of decisions may ever be considered final in a dynamic political economy.

The lack of adequate, continuous, and timely data on purchases of individual food products, however, has restricted the ERS ability to provide information on the types of foods different age and income groups purchase, what food substitutions are made as relative prices change, how changes in food prices influence household nutrition, how changes in food prices affect the purchase of convenience foods, and the percent of income spent on food by age, income, and locational characteristics of consumers.

The quality of demand estimates, and, hence, price forecasts made by ERS, has been severely limited by the current scarcity of information about consumer buying behavior and purchases of food. Data currently available are very inadequate with respect to quantity, quality, and timeliness. If ERS is to improve its performance in forecasting food prices and consumption and providing much needed up-to-date information, additional information and data must be provided. Weekly reporting of quantities and prices of food purchases from a national sample of consumers is needed to facilitate new analyses of the dynamic nature of demand parameters, consumer entry-exits in the market, short-term food price and consumption forecasts, and seasonal demand patterns. This would open up whole new areas in demand analysis research which are not possible with the data now available.

Two other research programs will obtain information on household food purchases or consumption. One is the Household Food Consumption Survey now under way in the Agricultural Research Service; the other is the proposed continuing Consumer Expenditure Survey by the Bureau of Labor Statistics. These are important additions to the data base, but are insufficient to achieve the objectives of this proposal.

Proposed Plan for Achieving Objectives

Improved analysis of demand and price effects of changes in the supply of individual food products is dependent on developing better current information on consumer purchases of foods over time.

To obtain the needed information for these analyses, data on food purchases and prices would be obtained from a national probability sample of approximately 2,500 households stratified by income and family size.

The consumer panel would provide weekly information on purchases and prices paid. Summaries of the data would be available within 2 or 3 weeks after the end of the period. It would also provide monthly and quarterly data in much more detail than the weekly data for use in more extensive analyses.

Panel data would be used to determine by statistical and econometric methods, consumer reaction to price changes, income changes, and changes in purchases of one food in response to changes in prices of other foods. Differences in responses due to location, urbanization, occupation, education, race, and food program participation would also be measured in the analysis. Account would be taken of changes in purchase patterns due to changes in form, packaging, seasonal availability, advertising and promotion activities, and similar market phenomena.

Specifically, ERS would:

- a. Establish through contract, a nationwide probability sample of households stratified by high-, medium-, and low-income levels, supplemented with a special sample of low-income households. This sample also would be representative of the national household universe by other socioeconomic and demographic variables including size and composition of household membership, age and occupation of household head, and racial composition.
- b. Classify all major edible food commodity groups (such as meat, dairy, produce, grain, and other edible foods) by generic identification, fresh and processed by grades, and unit sizes within grades.
- c. Process, summarize, and report basic raw data weekly to include household expenditures, quantities purchased, and unit prices paid for each item.
- d. Report monthly retail prices, quantities, and expenditures for food products purchased for household consumption by the following demographic variables: geographic regions, all major income levels, household size and composition, age and occupation of household head, and racial composition.

- e. Develop economic models utilizing the panel data to determine consumer food purchase reactions to such factors as changes in income and relative prices of specific food items.
- f. Obtain information on away-from-home food purchases from a sample of households to round out the information on food purchases for home use.

Objectives

1. Develop an improved capability for collecting, processing, and analyzing economic, political, social, and physical data on foreign countries and regions.
2. Apply the expanded information and analytic base to maintain and improve country and regional systems for forecasting foreign agricultural production, consumption, and trade that are integrated into an overall system for forecasting world and U.S. agricultural developments.
3. Develop an expanded research program on the structure and performance of the agricultural and related sectors in foreign countries, and on the economic and policy developments that have either short- or long-term impacts on their agricultural sector.

Need for Achieving Objectives

There is a recognized need for upgrading the current intelligence and analytical input into world situation and outlook information. This upgrading would contribute to an improvement in consistency, objectivity, and reliability of information made available to the public. An important component in this undertaking is a more comprehensive collection and indepth analysis of a wider range of foreign data, and a fuller integration of foreign and domestic information through quantitative analytical systems. The 1976 OTA report entitled Food Information Systems, Summary and Analysis states that, "More detailed analyses of the factors that determine production and consumption are required to improve the reliability of USDA's world estimates."

Various world-wide phenomena, beginning most dramatically with the energy crisis in 1973, have highlighted world interdependence. The world food situation received increased world-wide attention as disequilibrium in demand and supply led to wildly fluctuating prices. Agricultural trade in absolute terms and in relationship to overall trade has taken on increased significance. Events external to the United States have had a significant impact domestically. Short, world supplies of agricultural commodities sharply increased the value of U.S. agricultural exports, but concern is growing that exports may decline and surpluses accumulate.

An awareness of the interdependence of within-country events is also growing and supports the need for comprehensive country analysis. Some countries are already adjusting agriculture policies to the broader needs of macroeconomic policy.

The collection, assimilation, and analysis of more country-specific information is needed for a better assessment of world agricultural markets and the U.S. share by country (and region) and by commodity. This expanded information base of both macro- and microdata will be essential in the development of world trade models and improved linkages between the United States and the rest of the world. Also important, however, will be the improved ability to take individual commodities, general economic policy, agricultural and trade policies, and broad political and social phenomena and relate and integrate them into an overall country picture.

Proposed Plan for Achieving Objectives

The major thrust of this proposal would be to provide a more complete set of country- and regional-specific information, both factual and analytical. It would complement other ongoing research activities covering international trade and development issues. It would be interactive with the various modeling efforts providing data and relationships for development of improved models, and in turn using the models to more efficiently expand the depth and scope of country and regional analysis. For example, country analysts would continue to work closely with colleagues who are developing country models. They would assume responsibility for those models when they become operational, and use them in their analysis while keeping them up-to-date and making improvements. The improved understanding of economic and policy factors affecting production and production potentials would strengthen the analytical base of the supply component of projections models. There would be close and constant cooperation with analysts developing our analytical forecasting systems to facilitate the development of realistic and comprehensive models, and in the operation of those models to provide a qualitative evaluation of the effect of development not amenable to incorporation into the models.

Critical to the achievement of the objectives is a lowering of the foreign country/analyst ratio. This ratio is now 5.3 countries per analyst. For Western Europe, a major market for U.S. agricultural exports, the country/analyst ratio is 3.6/1. For Africa and the Middle East, embracing both food-aid countries and affluent cash markets, the country/analyst ratio is 12/1. The only effective way of acquiring added country and regional expertise to meet ongoing, broad intelligence and integrative analytical needs is to add to in-house staff.

A more comprehensive, systematic, and timely development of parameters essential to the estimation of country, regional, and world production, consumption, and trade and the U.S. trade share would be undertaken. A major focus of the research would be to provide in-depth country and regional intelligence and analysis in support of the World Food and Agricultural Outlook and Situation Board. The responsibilities of the country analyst will be significantly expanded to encompass the acquisition and integration of a wider range of data and information on developments affecting a country's imports of agricultural products.

Special attention would be given to gaining an understanding of a country's agricultural and economic policies and their likely impacts on production, consumption, and trade of agricultural products.

An integral part of the research would be a continuing assessment of the production potential for major agricultural commodities, taking into account the resources and the stimulus to their development and use provided by the economic environment and policies affecting this environment. Among the inputs, those associated with energy availability and prices will receive special attention. The influences of weather patterns and variability on the stability of production levels and product mixes would be analyzed. Responsibility for more comprehensive information and analyses of domestic price and price behavior, and the consequent impacts on supply and demand of commodities, is an important component of the proposed expanded role of the country analyst.

More complete and comprehensive assessment of a country's food and agricultural performance can be achieved by devoting more time to analysis of available data and information. However, this proposal would lead to an expansion of the information base both in more fully exploiting existing channels and in developing new sources. Increased contact with the country's agricultural research community would permit fuller utilization of indigenous research results, and thus reduce duplication of effort. More extensive foreign travel would facilitate the contact and permit the identification and exploitation of other information sources.

Coincident with the more comprehensive development of country analysis, increased attention would be directed toward improving the framework for regional analysis to assure proper aggregation of country forecasts, and to study issues having a regional impact. The impact of the development of regional organizations would be the subject of continuing study.

Objectives

1. To improve the availability of data on rural conditions, to expand monitoring of currently available data, and to improve ERS ability to disseminate that information to people who make decisions that affect the quality of life in rural areas.
2. To provide expanded and more accurate analyses of factors underlying rural conditions. Particularly urgent is work on rural labor supply and migration, and on rural credit, especially credit for business and industry.

Need for Achieving Objectives

Through the Rural Development Act of 1972 and other instruments, the Federal government has adopted a policy of encouraging the expansion of nonfarm income and employment opportunities to people in rural areas. There currently is increased interest in improving the Department's capacity to assist in achieving the objectives of the act. However, the current information base and research capability in ERS to backstop the Departmental initiatives is inadequate. For example:

- A fair amount is known about nonfarm businesses and about living conditions in rural areas, but there are large gaps in this knowledge, and there is no systematic way to make this information available to decisionmakers, as is done with the commodity situation reports. Consequently, decisions affecting rural areas are made with unnecessarily inadequate information.
- There has been a turnaround in population movement to rural areas from the cities in the last few years, but little is known about the characteristics of the migrants or the reasons for the turnaround. Consequently, little can be said about the implications of this turnaround for rural development policies.
- A good deal is known about employment conditions in rural areas, but knowledge of the labor markets is inadequate. For example, little is known about commuting patterns and the extent to which workers are willing to migrate to find jobs. As a result, adequate guidance cannot be given to policymakers on questions such as designing industrial location programs and evaluating the effects on communities when new industries cause sharp increases in employment.
- Incomes in rural areas are lower than in urban areas, but the extent to which differences in the cost of living mitigate this

is not known. Consequently, it cannot be said whether it is appropriate for federal programs to provide the same dollar benefits in rural as in urban areas.

- There is a limited amount of information on credit conditions for housing in rural areas, but little data is available on credit for business and industrial uses, consumer credit, and other uses of credit by rural people. Consequently, decisions about programs to improve rural business through expanded credit availability must be made without adequate information on capital and credit conditions and their impacts.
- Statistics are available on a variety of characteristics of specific areas, from incomes to health to housing quality, but there is no way to relate these statistics one to another to indicate their impact on the quality of life in an area. Consequently, it is difficult to help policymakers decide which areas and which problems to attack first.
- Similarly, limited resources have precluded quantification of relationships among economic and social variables affecting life in rural areas. Consequently, forecasts on likely changes in these variables to allow for action on the part of public and private decisionmakers cannot be made.
- Current federal programs for rural development provide much of their assistance through local governments. However, officials of these governments often do not have ready access to the kinds of information and analysis required for them to most effectively utilize the federal assistance. At current resource levels, systematic dissemination of available research to these decision-makers cannot be provided.

Proposed Plan for Achieving Objectives

ERS has small programs underway which will provide a basis for building adequate programs in each of the three areas proposed for expansion. Specific plans for those three areas are:

1. Expanded Reporting of the Nonfarm Situation in Rural Areas

During FY '78, ERS will be experimenting with publication of a periodic review of conditions in rural areas. The review will encompass current changes in population, employment, and incomes, as well as reports on housing conditions, State and local government services, and business activity. The experimental program during FY '78 will aid in identification of particularly critical shortfalls in the available data, which will need to be filled either

through analysis of secondary data not presently being analyzed or through primary surveys. With additional resources it would be possible to expand the frequency of the report to quarterly, and to undertake analyses of subjects, such as recent changes in industrial location and business activity in rural areas, for which data are not now available on a comprehensive basis.

2. Rural Credit

Analyses would be undertaken of conditions in particular credit markets either on a broad national scale or within specific rural areas. These analyses would be designed to provide an improved understanding of the way in which the markets operate and the forces which shape supply and demand within them. Data would come both from secondary sources and from primary surveys. As these studies develop, efforts would be made to link them to provide an overall, coordinated picture of factors underlying the supply and demand for financial capital in rural areas.

3. Analyses of Labor Markets

ERS presently has access to a substantial amount of information on employment conditions in rural labor markets, but resources are not available to analyze the occupational, residential, and wage structure of those labor markets and the forces which act to affect local labor supply and demand. Planned during FY '79 would be a series of analyses of factors affecting labor supply, with particular emphasis on the changing nature of employment opportunities in rural areas; commuting patterns and access to jobs; migration of workers to new jobs in rural areas; the reduction of out-migration of workers from rural areas; and the effects of public policy such as job training and alternative welfare proposals on participation in the rural labor force. Analyses also would be undertaken of the employment experiences of rural subpopulations such as youth, minorities, women, and the elderly. These issues are of increasing importance because of the redistribution of population underway since 1970, and the likely impact in rural areas of increased activity related to energy development. The analyses would be conducted primarily from secondary data now available from the Bureau of Census and other sources. They would be aimed at improving our ability to advise policymakers on the impact of business expansion in rural areas, on the indigenous working age population, on the structure of rural community institutions, and on the demand for public services.

Objectives

The proposed objective is to enhance the effectiveness of public decisions that control water pollution from agricultural nonpoint sources (sediment, plant nutrients, animal wastes, pesticides, and mineral salts). Pollution abatement policies and programs will be evaluated in terms of economic, institutional, and environmental effects on agriculture and rural areas. The research will include national, regional, and local analyses. More specifically, the objectives are to:

1. Evaluate the impacts of alternative nonpoint pollution abatement practices on farm production costs and returns, prices of food and fiber, and shifts in location of production of specific crops.
2. Assess the cost effectiveness of individual control measures (best management practices) and total management system for the control of nonpoint source pollution.
3. Determine linkages between nonpoint abatement practices (such as reduced tillage, terraces, sod waterways and improved irrigation, and pesticide application) and improvements in water quality.
4. Evaluate alternative incentive programs (cost sharing, taxes, pricing policies) that may be necessary to encourage adoption of nonpoint abatement practices to enhance water quality.
5. Estimate off-site economic and environmental benefits and costs of nonpoint pollution abatement practices, and analyze their distribution among various public user groups.
6. Develop methodology for use in planning assistance (assessment and evaluation) by state and local agencies in preparing section 208, river basin, and small watershed plans, and for implementing decisions to enhance water quality.

Need for Achieving Objectives

Public Law 92-500 established ambitious water quality goals for the Nation's rivers and streams to achieve "fishable and swimmable streams" by 1983 and "zero discharge" by 1985. Standards have been established for point source pollution. Now procedures have been set in motion through section 208, the most important provision applicable to agriculture, to develop plans for and implement nonpoint pollution control measures. State and areawide water quality management plans and the controls required, covering both point and nonpoint source pollution, are to be submitted to EPA for review.

and approval no later than November 1, 1978. Research regarding the abatement of agricultural nonpoint sources of pollution is difficult because of the complex relationship between recommended farming practices and improvement in water quality. These relationships are generally assumed, a priori, with little analysis to support such conclusions, or to adequately evaluate economic and environmental impacts. Failure to adequately appraise the economic and environmental tradeoffs of alternative nonpoint pollution abatement plans and policies could result in serious disruptions in food and fiber supplies and threaten the viability of U.S. agriculture. Thus, it is imperative that a major program of research be initiated to provide creditable economic and environmental information to State and areawide section 208 planners, USDA, EPA, agricultural organizations, Congress, and the public concerned with implementation of water quality enhancement programs.

With a substantial increase in resources, there would be: (a) expanded studies of the economic impacts of selected water quality policies to all U.S. major regions with significant water quality problems, such as sedimentation and salinity, (b) studies initiated of the cost effectiveness of best management practices and total management systems in all major production regions, (c) establishment of an interdisciplinary team including ARS and university staff to determine the linkages between pollution abatement procedures and water quality, (d) completion of the development of methodology for estimating environmental benefits and costs, (e) research initiated on alternative incentive programs to encourage adoption of pollution abatement practices, and (f) methodology completed for use in section 208 planning assistance.

ECONOMIC FEASIBILITY OF BIOLOGICAL AND CULTURAL PEST CONTROL AND INTEGRATED PEST MANAGEMENT PROGRAMS

Objectives

The proposed research will evaluate economic feasibility and implications of promising new pest control techniques, and assess their use in integrated pest management programs. These techniques are potential substitutes for chemical pesticides or, in some cases, may be used along with chemical pesticides. Promising new controls include nonchemical as well as chemical techniques. Examples of the nonchemical techniques are host plant resistance, genetic modifications, microbial agents, importation and augmentation of parasites and predators, and changes in tillage and rotation practices. New chemical techniques include growth regulators and behavior chemicals. Integrated pest management is a concept of combining chemical, biological, and cultural practices to achieve a desired level of pest control. The purpose of these programs is to develop pest management systems that are economically feasible, and yet have a minimal adverse impact on the environment. The research will focus on the economic significance to national, regional, and local areas. All research will be carried out in cooperation with other Departmental agencies including Animal and Plant Health Inspection Service (APHIS), Agricultural Research Service (ARS), Cooperative State Research Service (CSRS), and Extension Service (ES). Specific objectives are:

1. Evaluate the economic feasibility of new biological agents and cultural practices to control critical pests, and assess the economic and environmental implications of adoption.
2. Appraise the economic effectiveness and feasibility of selected projects in the ARS Pilot Pest Control Program.
3. Assess the economic implications of State/ES integrated pest management trial programs, and project the economic implications of the adoption of these programs on a regional and/or national scale.
4. Evaluate the economic effects of USDA sponsored quarantine and eradication programs, and the environmental benefits that may be derived.
5. Evaluate the need for and implications of alternative incentive programs and institutional mechanisms that may be required to promote the adoption of biological and cultural practices and programs.

Need for Achieving Objectives

The increasing concern for environmental quality and human health as expressed in the Federal Insecticide, Rodenticide and Fungicide Act (FIFRA)

has created the need to develop alternatives to chemical pesticides to achieve necessary levels of pest control. This concern has resulted in a mandate to the Environmental Protection Agency to review the registration of all pesticides. It is likely that several important pesticides will not be reregistered. In addition to the health and environmental concerns, there is increasing evidence that traditional chemical pesticides are becoming less effective as a result of pest resistance. These two factors highlight the need for research on alternative pest control practices.

The President's environmental message stressed the importance of developing safer and more efficient pest control technologies, and encouraged the development and use of promising integrated pest management options. The Departmental Pest Management Work Group identified about \$330 million devoted to pest control research and programs, with only a low level of resources allocated to economic issues of pest control technologies and integrated pest management. The work group identified this as a key void in the Department's program.

It was recognized that the economic feasibility of a practice or program is the primary factor that will determine whether it is adopted. Economic evaluation also is an important factor in guiding further research. As a result, other agencies in the Department, through the work group, have requested ERS to develop a program to assess the economic feasibility of pest control technologies and programs, and to estimate the economic implications of widespread adoption. The information flowing from this research is needed by other Departmental agencies, EPA, CEQ, agricultural organizations, Congress, and the public concerned with environmental quality and human health.

With a substantial increase in resources we would: (1) expand cooperative work with ARS in evaluating the economic feasibility of new biological agents and cultural practices, including assessments of environmental benefits that may be derived, (2) assign staff to evaluate the economic effectiveness of a number of projects in ARS' Pilot Pest Control Program, (3) work with the States and ES to initiate the assessments of the cost and returns of integrated pest management trial programs, and develop the methodology required for assessing the implications of expanding these programs, (4) initiate an evaluation of economic effects of selected quarantine and eradication programs managed by APHIS, and (5) initiate evaluation of the need for and implications of alternative incentive programs and institutional mechanisms to promote the production and distribution of biological agents, and to help ensure adoption by farmers.

Objectives

1. Determine the effects of alternative domestic food programs.
2. Determine nutritional effects of U.S. agricultural and regulatory programs, and of changes in the food production and marketing system.
3. Analyze the effects on food choices of prices, income, family size and composition, advertising, and labeling.
4. Determine the interrelationships of income, nutrition, health, and productivity in nutritionally disadvantaged groups.

Need for Achieving Objectives

The food and agricultural programs of the Department of Agriculture and the regulatory programs of the Department and other Federal agencies have marked effects, both direct and indirect, on the amount of food consumed, the type of food consumed, and the resulting nutritional levels of diets. The analytical base presently available to determine the impacts of the present programs and alternatives is inadequate.

Nearly all of the agricultural and food programs of the Department of Agriculture and other government agencies have nutritional implications. Some of these are direct--more of one kind of food or changes in the characteristics of that food--but most are through price effects. When government programs change the relative prices of food, more of some things are consumed and less of others. Similarly, technological and economic changes in the production and marketing system for food can have dietary impacts. The extent and direction of these effects are not now known. The data and analysis necessary to determine these nutritional effects are essential to improving the Department's analytical capability by bringing nutritional considerations into policy decisions.

The choices consumers make as to quantity and type of food consumed determine the nutritional level of diets. These food choices are influenced by changes in the production and marketing system for food products, including the development of new food products, new varieties of agricultural commodities, the technology of food processing, advertising, labeling, and many other factors. The effects of all these changes on food choices and diets must be known in order to estimate their impact. A concentrated research effort is needed to sort out the effects of all these factors and many others so that decisions by public and private agencies will contribute to improved nutritional levels rather than making diets worse. The costs of poor diets in specific

nutritionally vulnerable groups such as Hispanic Americans, Blacks, American Indians, and migrant farmworkers are probably large but unknown. The costs to the individuals and to society in terms of increased medical costs, lowered productivity, and diminished receptivity to education must be determined. The effects of different types of nutrition intervention programs can then be evaluated in terms of cost-effectiveness and better program design.

Proposed Plan for Achieving Objectives

Objective 1: The effects of domestic food programs would be analyzed to determine:

- Effects of the Food Stamp Program on diets of participants compared to diets of eligible nonparticipants.
- Effects of school feeding programs on consumption and diets of participating school children in comparison with children who do not participate.
- Effects of direct intervention programs (WIC and elderly feeding) on diets.
- Effects of multiple food programs in the same household (Food Stamp, School Lunch, School Breakfast, and WIC) on diets and consumption.
- Cost-effectiveness of present and alternative food programs in achieving nutritional goals.
- Effects of food programs on food price levels, farm income, the general economy, and agricultural programs.
- Effects of agricultural programs on the food programs.

Basic data would be obtained from a sample of low-income households on purchases of individual food items each week. The sample would include those families participating in the Food Stamp Program and other families who are qualified for the program but choose not to participate. This sample would supplement that planned under the proposal "Improving Forecasts of Food Demand and Prices." Statistical and econometric analysis would provide measures of the difference in diets which arises from participation in the Food Stamp Program and other nutrition intervention programs.

Objective 2: Analysis of the effects of other programs on nutritional levels would include:

- Effects of agricultural programs on nutritional levels, primarily through price changes.

- Effects of changes in the Federal standards of identity and Federal quality grades on food choices and nutritional levels.
- Effects of technological and economic changes in the production and marketing system for food on food choices and nutritional levels.
- Effects of rising energy costs on food prices, food choices, and nutritional levels.

Utilizing the basic information on consumer reaction to changes in prices and other variables, the nutritional effects of changes in U.S. agricultural and regulatory policy and changes in the food production and marketing system can be analyzed for their effects upon diets and nutrition. The consumer panel would provide information on the effects on different groups of consumers so that dietary impacts can be determined for various significant subgroups in the population, not merely for the U.S. average.

Objective 3: ERS would determine the effects of food choices (consumption, demand) on price, income, family size and composition, advertising, labeling, nutritional education, health status, and attitudes and lifestyles.

ERS would be able to sort out the effects of all of these factors on the food choices made by consumers, and on the resulting diets. The proposed consumer panel would provide the basic data on purchases of individual foods. Additional information will be obtained periodically on family size and composition, health status, attitudes and lifestyles, and other factors affecting food purchases. This would provide the basic data for statistical and econometric analyses of the factors affecting food choices. This research would require the insights of all of the social sciences, including economics, psychology, sociology, and anthropology.

Objective 4: In order to determine the interrelationships among income, nutrition, health, and productivity for specific nutritionally vulnerable groups, ERS would:

- Measure the impact of income limitations on nutrition.
- Measure the effects of malnutrition on labor productivity and illness, including infant mortality and impairment.
- Measure the ability of education programs to cause improvement in nutrient intake.

A pilot study of one homogeneous socioeconomic group will be undertaken. Nutrient intake would be monitored 1 week quarterly for 2 years. Based on the experimental designs selected, certain groups will be formed by random assignment--treatment and control groups. Treatments will consist of education programs designed to improve nutritional intake.

APPENDIX I

ERS Base Funds by Program, FY 1978

Estimated Distribution of FY 1978 Appropriated Funds
by Major Program

<u>Program</u>	<u>\$000</u>
Economic Research and Analysis of Farm Programs and Policies	4,178
Economic Research and Analysis of Farm Structure and Resource Use and Productivity	3,698
Supply, Demand and Price Analysis--Forecasts and Projections	5,145
Economic Research and Analysis of Market Structure and Performance	4,358
Economic Research and Analysis of Agricultural Trade and Policies	4,097
Social and Economic Research and Analysis to Assist in Planning and Development of Rural Areas	3,520
Economic Research and Analysis of the Use and Development of Natural Resources	1,552
Economic Research and Analysis of Environmental Quality Issues	2,222
Economic Research and Analysis of Consumer Issues	367
Economic Analysis and Research to Improve Human Nutrition	568
TOTAL, Economic Research Service	\$29,705

APPENDIX II

Organization-Research Project Structure

Office of the Administrator

Acting Administrator, Kenneth R. Farrell, 448-GHI	78104
Acting Deputy Administrator, Food and Fiber Economics, Gary C. Taylor, 440-GHI	79250
Deputy Administrator, Resource and Development Economics, Lyle P. Schertz, 440-GHI	78710
Assistant to the Deputy Administrator, Byron L. Berntson, 440-GHI	75153
Assistant Administrator, Allan S. Johnson, 450-GHI	78464
Administrative Management Assistant, Joseph A. Braxton, 445-GHI	78505
Administrative Officer, Blanche F. Resnicoff, 445-GHI	78505

Data Services Center

Director, Vacant, 400-GHI	78824
Deputy Director, Roger Strickland, 400-GHI	73055
Systems and Programming Group, William Freund, 402-GHI	78862
Scientific Applications Group, Vacant, 402-GHI	79064
Forecasting Applications Group, Roger Strickland, 400-GHI	73055
Data Management Group, Jim Berry, 192-GHI	78110

Information Division

Director, Benjamin R. Blankenship, Jr., 448-GHI	78038
OSB Secretary, Geraldine C. Schumacher, 453-GHI	76250
Food and Fiber Information, James R. Sayre (Acting), 3919-S	76965
Resource and Development Information, James R. Sayre, 3919-S	76965
Popular Publications, Martin G. Schubkegel, 1670-S	73861
Publications Services, Joseph Zuessman, 0054-S	74640
Publications Distribution, 0054-S	77255

Food and Fiber Economics

Commodity Economics Division

Director, John G. Stovall, 350-GHI	78676
Deputy Director, Robert W. Bohall, 350-GHI	78229
Deputy Director, Preston E. LaFerney, 350-GHI	78860
Assistant Director, Lynn Rader, 350-GHI	78857
Assistant to the Director, Loyd C. Martin, 350-GHI	78231
Administrative Officer, Vacant, 351-GHI	78855
Acting Program Leader, Agricultural Policy Analysis, Milton H. Erickson, 356-GHI	78912
Analysis of Alternative Agricultural and Food Policies and Programs, Acting Leader, Milton H. Erickson, 356-GHI	78912
Current Analyses of Policy Issues, Leader, Milton H. Erickson, 356-GHI	78912
Cost of Production--Firm Enterprise Data System and Annual Survey Leader, Ronald D. Krenz, Stillwater, Oklahoma	FTS-731-3120

Program Leader, <u>Forecasting</u> , Wayne A. Boutwell, 206-GHI	77340
Cross Commodity Forecast Modeling, Leader, Abner Womack, 206-GHI	77340
Forecast Information System, Leader, Ed Overton, 206-GHI	77340
Outlook Coordination, Leader, A. Don Seaborg, 206-GHI	77340
Acting Program Leader, <u>Fruits, Vegetables, Sweetners, and Tobacco</u> , Owen Shugars, 200-GHI	78666
Outlook and Situation, Leader Vegetable Situation, Charles Porter, 200-GHI	78666
Fruit Situation, Jules V. Powell, 203-GHI	77133
Sweetners Situation, Thomas W. Little, 204-GHI	77290
Tobacco Situation, Robert H. Miller, 294-GHI	77290
Price Spreads and Components of Production and Marketing Costs, Leader, Margins, Stephen M. Raleigh, 200-GHI	78666
Costs, N. A. Wynn, 293-GHI	77133
Analysis of Structural Change and Economic Performance, Leader, Fruits and Vegetables, Ed Jesse, Davis, California	FTS-453-2715
Sweetners, Thomas W. Little, 294-GHI	77290
Tobacco, Owen K. Shugars, 200-GHI	78666
Supply, Demand, and Price Analysis for Forecasting and Policy Evaluation, Leader, Glenn Zepp, Gainesville, Florida	FTS-946-7218
Economic Impact of Federal Regulations Affecting Production and Marketing of U.S. Fruits, Nets and Vegetables, Leader, Ed Jesse, Davis California	FTS-453-2715
Program Leader, <u>Fibers and Oils</u> , John Baritelle, 212-GHI	78444
Situation and Outlook--Fibers and Oils, Co-Leader, Russell G. Barlowe, 212-GHI	78776
Co-Leader, George W. Kromer, 212-GHI	78444
Fiber and Oil Crops Production Systems, Leader, Fred T. Cook, Jr., Stoneville, Mississippi	COM-601-686-9311
Costs, Margins and Economics of Processing, Handling & Merchandising Fibers and Oil Crops, Co-Leader, Joseph L. Ghetti, Stoneville, Mississippi	COM-601-686-9311
Co-Leader, Harry O. Doty, 212-GHI	78444
Short Run Prediction and Price Analysis, Leader, Duane Hacklander, 212-GHI	78444
Analysis of Structural Impacts and Performance in the Fibers and Oils Crop Subsectors, Co-Leader, W. C. McArthur, Athens, Georgia	FTS-250-2281
Co-Leader, Bill Bolton, Baton Rouge, Louisiana	FTS-687-4441
Program Leader, <u>Grains and Feeds</u> , James J. Naive, 222-GHI	78636
Current Situation and Outlook Analysis, Leader, James J. Naive, 222-GHI	78636
Cost Components and Marketing Margins, Leader, Bill Lagrone, Lincoln, Nebraska	FTS-867-5447
Supply, Demand, and Price Analysis, Leader, Warren Grant, College Station, Texas	FTS-527-1267
Systems Analysis, Leader, Mack Leath, Urbana, Illinois	FTS-958-9154
Quality and Utilization, Leader, Floyd Niernberger, Manhattan, Kansas	FTS-752-4228

Program Leader, <u>Dairy</u> , John K. Hanes, 276-GHI	78376
Dairy Situation and Outlook, Leader, Charles Shaw, 276-GHI	78915
Productivity, Costs and Price Spreads in the Dairy Industry, Leader, Floyd A. Lasley, 278-GHI	78702
Supply and Demand Analysis and Projections, Leader, Charles Shaw, 276-GHI	78915
Industry Structure--Changes, Projections and Implications, Leader, Harold Lough, 271-GHI	74873
Policy Analysis Research, Co-Leader, Richard Fallert, 276-GHI	78915
Co-Leader, Boyd M. Buxton, St. Paul, Minnesota	COM-612-376-3437
Commodity Demand Analysis, Leader, Richard Haidacher, 276-GHI	78376
Program Leader, <u>Poultry Products</u> , George B. Rogers, 292-GHI	78699
Situation and Outlook Information, Leader, William Cathcart, 291-GHI	78801
Production and Marketing Adjustments, Co-Leader, Harold Jones, Athens, Georgia	FTS-250-2281
Co-Leader, George Rogers, 292-GHI	78699
Demand, Supply, Price and Subsector Analysis, Leader, William L. Henson, University Park, Pennsylvania	FTS-455-0467
Farm to Consumer Marketing Margins, Leader, Kenneth Blaze, 292-GHI	78342
Policy Analysis, Leader, George B. Rogers, 292-GHI	78699
Energy Use in Marketing and Processing Food and Fiber Commodities, Leader, Burton L. French, 293-GHI	78342
Program Leader, <u>Meat Animals</u> , Richard J. Crom, 361-GHI	78712
Outlook and Situation--Long Run Projections, Leader, James E. Nix, 362-GHI	78143
Structural Characteristics of the Beef and Pork Subsectors, Leader, Production, Roy Van Arsdall, Urbana, Illinois	FTS-958-9142
Packing and Distribution, Lawrence A. Duewer, 361-GHI	78470
Aggregate Analysis of Industry Performance, Acting Leader, Richard J. Crom, 361-GHI	78712
Economics of New Technologies in Livestock Production and Marketing, Leader, Virden Harrison, Clay Center, Nebraska	COM-402-762-3241
Economics of Production Resource Use and Technical Innovations in Beef Production, Leader, Ray F. Brokken, Corvallis Oregon	FTS-420-8404
Structure and Costs of Slaughtering, Processing and Distributing Meat, Leader, Lawrence A. Duewer, 361-GHI	78470

National Economic Analysis Division

Director, John E. Lee, 246-GHI	78831
Deputy Director, John H. Berry, 246-GHI	78827
Deputy Director, James L. Pearson, 246-GHI	78829
Assistant Director, Levi A. Powell, 246-GHI	78834
Administrative Officer, Vacant, 242-GHI	78819

<u>Program Leader, Inputs and Finance in the Food and Fiber Sector,</u>		
Robert D. Reinsel, 120-GHI		74943
<u>Finance, Robert D. Reinsel, 120-GHI</u>		74943
<u>Manufactured Inputs, Robert D. Reinsel, 120-GHI</u>		74943
<u>Input Productivity and Technology, Donald D. Durost, 114-GHI</u>		75457
<u>Real Estate, Robert D. Reinsel, 120-GHI</u>		74943
<u>Energy Conservation in the Food and Fiber Sector, Earle E. Gavett, 120-GHI</u>		74943
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